Aalto University
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How Chatbots Can Be Used to Re-Engage with Applicants During Recruitment

Master's Thesis
Espoo, 11th of August 2019

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ABSTRACT OF
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Finding the perfect combination of people to work within an organisation is one of the most challenging elements of the recruitment process. Without a complete recruitment strategy, a company cannot grow and innovate. To help gain new talent, the viability of a chatbot integration into the recruitment process, specifically during the re-engagement of past applicants was explored during this thesis. Design Thinking was the main methodology used to discover, define and ideate with the various stakeholders and pain-points in mind. This investigation demonstrates two applications of the ideation in order to 1. Update the applicant's information and search status 2. Comply with GDPR regulations on the transparency of how the applicant's data is being stored.

Interviews were carried out in order to investigate deeper into the current process from both the recruitment and applicant angle. Once needs were defined, a persona was created based on current chatbot targets and interviews. The prototype of the chatbot was designed in BotSociety, a chatbot prototyping interface technology, and was tested with participants who were interviewed during initial stages of research. They were asked to interact with the chatbot as if they were the user described in the persona. From there, they were given a survey and asked to describe their answers and reasoning. These answers were then both recorded for a qualitative analysis and used to evaluate the probability of the chatbot.

This thesis showcases the use of a chatbot to re-engage with past applicants and validates the tool as an alignment for recruiters to gain the search status of the past applicant. This chatbot also allows for the applicant to be more aware of how the company is complying with GDPR regulations, whilst learning more on how their data is being stored. This further demonstrates the value of any application to the company for the applicant, whilst creating a more positive experience ensuring transparency during the recruitment process and data management.

Keywords: Recruitment, Human Resources, Chatbots, Personas, Design Thinking, Messaging Applications, Conversational Interface Dialogue, User-Centered Design, Re-Engagement

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- Valérie Pedersén and Chu Zhu at This is Deploy for their tpatience, kindness and willingness to help with all things practical and always being supportive. Without this support and their vast knowledge, this thesis would not be possible. I hope this thesis topic gives a few insights and is a topic of discussion to continue the chatbot journey with current and future clients!

- Dr. Marko Niemienen for supporting me during the initial ideation phase, answering questions from an usability expert point of view and for always willing to have a meeting no matter where in the world he was.

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Keira Nicole Soutar

Abbreviations and Acronyms

UX	User Experience
HR	Human Resources
DT	Design Thinking
HRM	Human Resource Management
GDPR	General Data Protection Regulation
AI	Artifical Intelligence
NLP	Natural Language Processing
DIY	Do It Yourself
API	Application Programming Interface
ROI	Return on Investment
ICT	Information and Communications Technology
KTH	Kungliga Tekniska Högskolan (Swedish) Royal Institute of Technology (English)

Table of Contents

Chapter 1

Introduction

1.1 Background

An organisation is only as good as whom they are comprised of. Without a solid foundation of knowledge, leadership and problem solving, an organisation is bound to fail. The second most likely reason for a company to fail, behind poor market research and sales, is due to a lack of leadership and management skills [65]. Companies want to deliver real value not only to their customers but also to those working within it. Employees are the most valuable asset to any company. With a market that is as competitive as ever before, companies want to keep employees motivated, satisfied and eager to help build this value from within [66]. Ensuring that there are the right people not only leading but helping to support the company is that of Human Resources Management.

Human Resource Management is defined as a system of activities and strategies that focus on successfully managing employees at all levels of organisations to achieve organisational goals [67]. HRM of any organisation deals with an employee through their entire lifecycle starting with high engagement, later transitioning to variable engagement and trickling down to low engagement. This approach is also nicknamed 'hire - inspire - retire' [49]. This employee lifecycle is divided into six major stages.

1. **Attraction** - High Engagement
2. **Recruitment** - High Engagement
3. **Onboarding** - Variable Engagement
4. **Development** - Variable Engagement

5. **Retention** - Low Engagement
6. **Separation** - Low Engagement

The Attraction Stage is where the potential employee is researching companies and learning more about their values, culture and current open positions. This stage should show and disclose the real interest and desires of those the company is wanting to attract to be apart of the company. Maximising this initial first impression ensures that the company has its best foot forward to attract the best talent [79].

The Recruitment Stage is when the best talent from the attraction stage has applied to a posted position and been selected for further screening. This is where those selected will be filtered to ensure that all qualifications and skills meet those of requirement. This stage is the most human-focused as companies usually strive to create a positive candidate experience. As this is the step for choosing the best-suited candidate to join the company, it has high engagement, if not the highest engagement from HRM [79].

The Onboarding Stage is essentially the absorption process where candidates move from being an individual outside the company to one within. The key to this stage is to build a strong foundation as well as a connection between the newly hired and the organisation. Ensuring that the new hire is confident with the values and principles of the company while understanding where to look for answers when they are to arise is detrimental for success in the next stage [79].

The Development Stage is where an employee can branch out to learn and grow beyond their tasks and targets. This stage is vital for not only the next stage in their company lifecycle but to help any organisation develop and mature. Enabling this culture of learning can help employees to step outside their 'career comfort zone' and create career progression paths with possibilities of transitioning or discovering new meaningful roles [79].

The Retention Stage is not only about keeping employees within a company but is also being able to build a genuine connection. Ensuring that there is sufficient recognition while keeping employees valued and appreciated is one of the best ways to keep successful communication and transparency within an organisation. Design this stage around fulfilling employee values and open communication when these values are not being met is vital for real retention [79].

The Separation Stage is the endpoint of the lifecycle, where the employee wants to separate from the company. Although this involves low engagement from HRM, in order to ensure a strong attraction for future employees, they need to provide positive engagement during this transition. All of the hard work that was put into the past employee's lifecycle can result in a better foundation for the next hire's lifecycle [79].

No matter what size an organisation is, the lifecycles of their employees are relatively similar. With variations of engagement for these stages of an employee lifecycle, specialists or internal help is brought in to HRM to focus, define the process and enhance the experience [79]. Depending on the size of the organisation, during the attachment stage, marketing is brought in to ensure the potential material hires can see, from an organisation's website and social media reflects that of the companies values.

The second stage and the one with the highest engagement is that of recruitment [79]. In this stage, specific recruitment specialists handle the majority of the process before handing the employee over to other HRM members for the onboarding and later lifecycle stages. As this stage tries to create a positive candidate experience on all levels, this is a perfect usecase where technology could play a helping role in eliminating menial tasks of the recruiter.

Chatbots are just one form of technology that could help eliminate menial tasks performed on a day-to-day base by the recruiter and provide more attention to those that are more meaningful. A chatbot is defined as a "is a service, powered by rules and sometimes artificial intelligence, that you interact with via a chat interface. The service could be any number of things, ranging from functional to fun, and it could live in any major chat product" [71]. The first chatbot said to be produced in 1966 by Joseph Weizenbaum [70]. Although reviewed to be technically advanced at the time, in today's standards it does not quite meet the mark as it is a system that does not answer a question with a question, but a question with a question.

The development of chatbots since 2016 has been on a steady climb with the system integration into many messaging services, such as Facebook Messenger and Slack [61]. This is due in particular to the number of users of messaging applications surpassing the amount of those on social media in the last months of 2015 [10]. We also have the millennial generation to thank for this increase, as they are technology enthusiasts that have adopted technology into their daily routine, if not created a habit. With the rise of machine

learning, artificial intelligence and internet of things, our lives have become even more connected and smart [3] . It is no question that this interaction with technology is nothing but natural and second natured in this day-in-age. Today, chatbots are here to radically change the way in with we communicate to learn, ask to know and expand our concept of extensive human interaction.

Some of us use chatbot technology today to remind us to take our birth control pills (*Super Izzy*)[1], inform us of the weather (*Poncho Chatbot*)[2] or even help us cook a meal with current ingredients found in our fridge (*Whole Foods Messaging app*)[3]. Although this is natural, similar to messaging our friends on a messaging platform, many companies are also trying to implement this natural habit into the workplace. *AvePoint* is just one example of aid for any office worker using Office 365 [4]. It aids in locating and restoring content. It also helps protect from lost or deleted files and ensures a secure workplace when collaborating with Microsoft Teams[5].

William Gibson in 2003 stated that "The future is already here – it is just not evenly distributed" [28]. Some areas can see that technology is the future; it is just the means or distribution and adaption. As we can see, there are already some significant use cases for chatbots to aid in our daily lives and in the workplace. Using the quote from Gibson as a foundation, this thesis will be an exploratory effort in applying Design Thinking to the second stage of the employee lifecycle, recruitment. From the application of this methodology and user research, highlighting pain-points and ideating solutions in the form of chatbots, could this necessarily be the way to create a more positive candidate experience?

1.2 Motivation

Throughout my bachelors, it was advised that during the summer months, everyone attempted to locate an internship to apply learnings from class into the real world. With so many students seeking for similar positions at the same time, the process was even more competitive and draining. Having

[1] `http://www.superizzy.ai/`
[2] `https://www.kik.com/bots/poncho/`
[3] `https://www.chatbotguide.org/whole-foods-bot`
[4] `https://www.office.com/`
[5] `https://teams.microsoft.com/`

friends in Co-op [6] based programmes , allowed me to witness before my first application of a summer position, the stress and negative experience many students had.

During my application process, I began to understand the frustration and negative experience, so many of my friends had. Companies seemed tremendous and open for connection, but with later stages, there was a lack of transparency and communication from their side. With so many applicants, one can understand the level of work needed to send not only acceptance emails to the next stages but also rejection emails. The time spent on each application and motivation letter turned into annoyance and misunderstanding to why there was no communication between the company and applicants, not even a no - just radio silence. This was in contrast to anything we had in the past, as universities had always given us a yes or no answer when applying to study.

Fast forward five years, I found myself working at a company helping to connect candidates with study abroad and online programmes around the world. During my time there, I was able to understand that there are people out there in the world trying to make application experiences more transparent, comprehensive and better. From this experience of not only applying for that position but seeing first hand that people are trying to make these application experiences better, I knew there was potential for exploration of the problem.

During my master degree studies in Human-Computer Interaction Design, we focused a lot on experiences and how to develop a thinking of what the needs and wants of the end-user are. A system can be great in theory or even in design, but if it is not usable by the user or leaves them in frustration, why would they use it again. This was my thought when it came to the application process for a position, many of the time, the applicant is unhappy with the lack of communication and transparency. With even more technology becoming available in the market and influencing our lives, those in my studies have been told to push the boundaries in understanding the cause of 'pain-points'. Understanding how humans use and interact with computers and technology can only help improve it for the future and inspire more potential creative solutions we already have in place in the world.

Being able to work on many projects with the three Ds: Define, Design and Develop has created a solid foundation and methodology to further an

[6] '... method of combining education with practical work experience.' [18]

existing technology to distribute the future evenly, or merely improve, the experience of the recruitment process. Many times, we just think about the end-user and their experience, although there are many points of interaction and individuals involved. By using a Design Thinking methodology, the process will be understood, explored, and ready for implementation. By better understanding the process and its stakeholders, we can better explore the options of the pain-points of implementation of a chatbot.

The main output of this thesis is to work with the Design Thinking method, specifically *Understand* and *Explore* stages, to define a recruitment flowchart, locate pain-points and explore possible chatbot solutions to keep open communication. User interviews for both recruiter and applicant and final user surveys for an applicant will be conducted to help empathise and define pain-points. This user research will form the foundation of understanding both users and serve as the base of exploration of chatbot possibilities within various pain-points of recruitment.

By delving into user research, the thesis will be able to provide another use case for companies to separate themselves from the competition further, be efficient in the recruitment process all while finding the best employees for company growth and development.

This thesis was conducted in conjunction with the Stockholm tech agency, This is Deploy[7]. Deploy has an elite team covering the entire chain of Web/ mobile product development, with an abundant of experience in startup, product design, development and team/process management, scaling in infrastructure, as well as growth. They also specialise in AI-powered Chatbot development. During the summer of 2018, I was apart of the team helping to develop and test a chatbot for the recruitment for a large Swedish consulting firm. This chatbot was developed for the engagement stage to help potential applicants learn more about the consulting firm, open positions and working culture.

With the chatbot being fully implemented, the feedback from not only the applicants, but also that of the firm has only been positive. Both now have a workflow more fitting to their needs. Meaning, applicants can now get the answers whenever they need them, while recruiters and Human Resources can spend more time towards more meaningful tasks. The firm also gains a better reputation by always being available to potential applicants and keeps

[7] `https://thisisdeploy.com/`

them in the loop when they needed, versus not being able to find the answer or having to wait for a reply during working hours.

Deploy is very keen on learning what other stages within the recruitment process, they can help other companies with the integration of a chatbot, as the one mentioned above was so well received.

1.3 Outline of Thesis

This Masters thesis is divided into the following nine chapters:

Chapter 1 introduces the background of the various topics included in understanding the recruitment process and the potential of technology aid withing the process. It also adds the motivation of the author and introduces the company supervising and aiding the research for this thesis.

Chapter 2 defines the initial assumption or hypothesis of the results of the study by the author and the questions aiding to validate or null such hypothesis.

Chapter 3 delves deeper into the beginning foundation of research currently in the market for the topic of recruitment, user experience, chatbots and the methodology to help test such a hypothesis.

Chapter 4 describes the steps from the study using the defined methodology of Design Thinking and defines the pain-point topic of re-engagement during the recruitment process. It later goes into detail of the development needed to create a chatbot to aid such pain-point.

Chapter 5 defines the conversation style and personality of the chatbot with the introduction of various design goals and interaction flows. These are designed with the users' needs in mind, outlined in chapter 4.

Chapter 6 establishes the implementation of a prototype needed to aid with re-engagement from the foundation created in chapter 5. Outlines of the usability test and the results can also be located here.

Chapter 7 analyses the actions taken throughout this thesis research whilst providing concentre answers to the research questions asked in chapter 2.

Chapter 8 describes the limitations of the thesis research.

Chapter 9 demonstrates the possible advancements for the future of the study for further insights and development whilst concluding the study from chapter 3.

Chapter 2

Research Questions and Hypothesis

The initial assumption is that there are many areas of the recruitment process where technology, specifically conversational AI, could be implemented to aid in the reduction of friction. There is much conversation between the applicant and company during the recruitment process, and much of that from my experience and others, a follow-up conversation is missing. Chatbots or conversational AI is an exciting technology that could be implemented in order to gain further information from applicants but also reduce friction in asking for further information. Many individuals feel as if they are left out of the loop with it comes to communication with companies, and many do in fact 'ghost' their applicants [68]. "Ghosting is the practice of ending a personal relationship with someone by suddenly and without explanation withdrawing from all communication [48]." The concept of a chatbot could be used for being transparent on the process of the applications to asking for a reference not included or asked for earlier in order to continue the process. The primary purpose of this thesis is to highlight the current pain-points whilst ideating possible solutions of how a conversational AI system or chatbot, could be implemented to aid in the recruitment process. With the general understanding stated, the following questions are the main focus of exploration:

1. **What are the current pain-points within recruitment?**

The goal is to define the recruitment process at a high level and investigate where the location of the current pain-points are. The question is meant to narrow down the process into various sectors where help is needed to reduce friction. Based on the needs of the various pain-points, further deliberation will be needed to define one sector for this thesis and will determine the

sector of Research Question 2. This will also allow the needs of the user to be viewed and outlined in order to help with the ideation of a solution.

2. **How can a chatbot be incorporated to aid with the pain-points located within recruitment?**?

The goal is to figure out if it is possible for chatbot technology to be used in order to relieve the friction of the sector located within research question 1. The question is meant to give one example of a conversation that could be had between for the chatbot in order to help reduce friction during the recruitment process.

Research question 2 has been divided into two sections to understand more about how the interaction with the chatbot would be perceived.

a. **How was the overall experience of the interaction with the chatbot?**

b. **What is the comfort level of giving information about yourself to the chatbot?**

The overall interaction experience with adding technology to replace a sector for a process predominantly done by a human is a vital constant to any adaptation. Adding technology into the mix could be seen as an advantage in contrast to repeating knowledge already retained via a form or recent conversation. This is also necessary when it comes to the willingness and comfort of the individual giving personal or sensitive information to a chatbot vs to a human, as some could see the interaction to be not as confidential than other means known to them from other day-to-day interactions.

Chapter 3

Literature Review

The following section will be to further the foundation of knowledge the thesis. This will help the reader to understand the current recruitment system in place, why the adoption of Design Thinking was used and the current roles of chatbots that are already implemented in the world and HR today.

3.1 Recruitment Process

The scope of the main types of questions needing to be asked for successful recruitment has fundamentally been the same since individuals needed help performing specific tasks. The foundation of:

- Whom to recruit? (placement)
- Where to recruit? (location)
- When to recruit? (time and date)
- What message to convey? (style)

Having a strategy around these recruitment questions can only lead the process to be more effective in locating the best candidates [64].

Having a proper recruitment strategy that ties into the companies values and corporate objectives is just one way in which the company can already set the tone for the way that they work to its applicants, as mentioned in Chapter 1 [64].

The Recruitment Stage is when the best talent from the Attraction Stage has applied to an open position and been selected for further screening. This is where those selected will be filtered to ensure that all qualifications and skills meet those of requirement. This stage is the most human-focused as companies usually strive to create a positive candidate experience [5]. As this is the step for choosing the best-suited candidate to join the company, it has high engagement, if not the highest engagement from Human Resource Management [67].

With such high engagement needed, the process and strategy must have a solid foundation with flexibility, as not all positions require a skills test and so forth. Below is a general chart of the process described by Mahmudul Hassan Munna although thesis author illustrated [60].

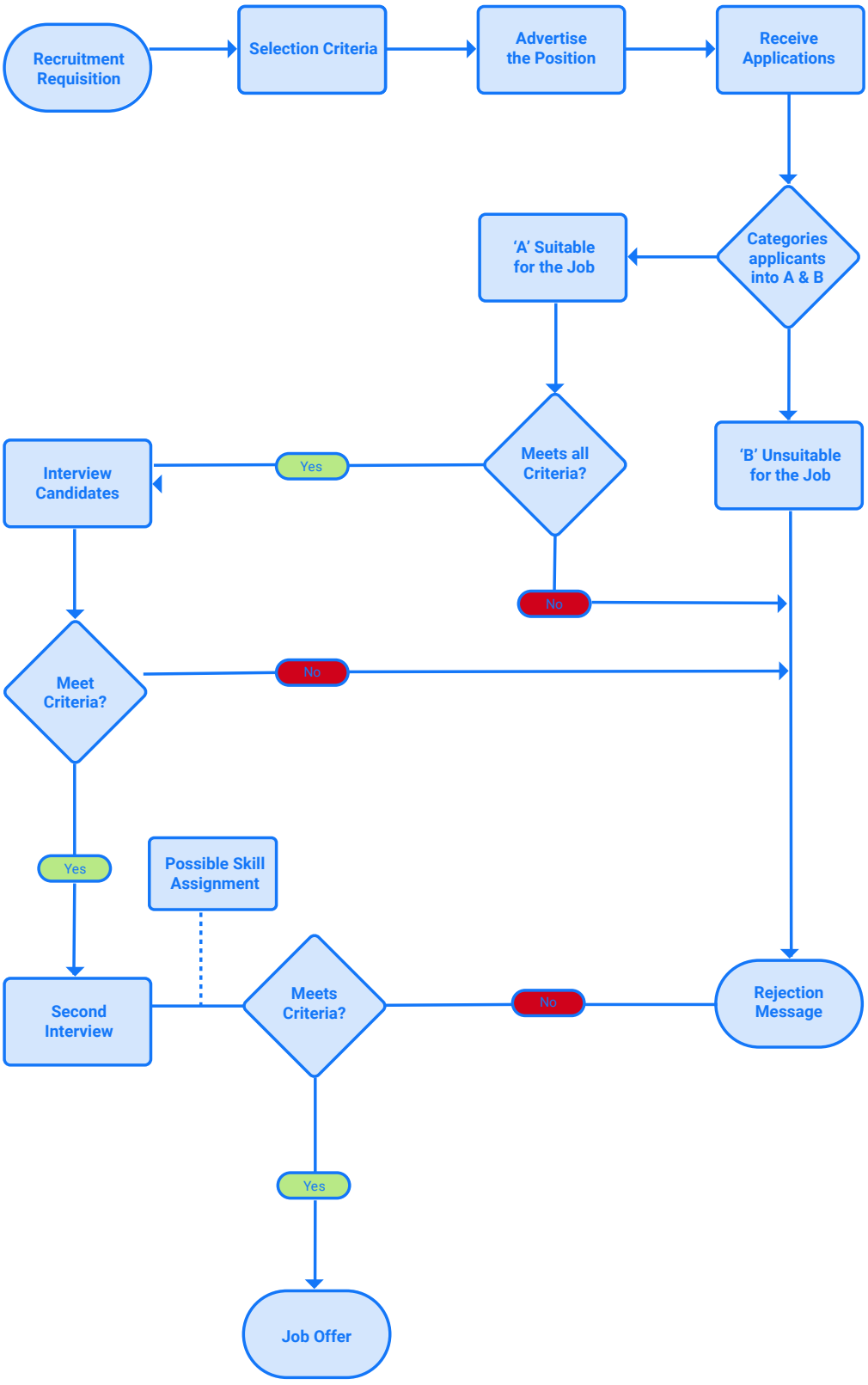

Figure 3.1: The Recruitment Process [60]

From looking at Figure 3.1, we can see that there are many streams in which a candidate can follow. Below is more detail about each stage from the knowledge of stakeholders to the level of complexity for each of the steps.

- **Recruitment Requisition** : This is the stage where a need or the question of 'whom to recruit? (placement)' is defined. Usually, the manager of the department needing to create or fill a position will inform the Human Resources department in order to begin implementing and creating a recruitment strategy for the position. [2]

- **Selection Criteria** : As the 'whom to recruit? (placement)' has already been defined in the past stage; this stage is where the other questions will be defined. 'Where to recruit? (location)'is essential as many teams are only located in one area or extra help may be needed in another location. This ensures that the selection is defined in one area. Without this definition, there could be an issue of hiring someone not willing to move to the location or do not have the correct permits to do so. This then follows suit into 'What recruitment sources to use? (platform)' . As a company needs to ensure that they are recruiting the right people, they need to ensure that how they are connecting is with the correct platforms. For example, one cannot post a job position on their Facebook page in order to attract an individual from China, as Facebook is blocked in China. Knowing the culture and top locations people post is critical for successful recruitment. 'When to recruit? (time and date) 'follows suit with respect to the other questions. The hiring manager needs to ensure they are able to add an individual at the right time. If there is a resource needed as soon as possible, this needed to be conveyed to the recruiter to allow for maximum coverage on all channels being used to find someone. This is also the case for upcoming positions having a plan in action. [2]

- **Advertise the Position** : Once everything has been defined concerning the timeline, sources and location, the need for 'What message to convey? (style)' needs to be determined. Brand management is asked to help with this as today; it is a candidate market, not a company market. Many people find the position first, not so much the company anymore. Brand management and Human Resources will work together in demonstrating to the applicants what the company has to offer, showing them how they are different from others in the market. Using this method and connecting it with the job position can ensure that the advert is the key to connecting you to the right applicants. [2]

- **Receive Applications** : Once having defined the answers to the questions above and posting the position, applications should be coming in for the position. As some positions may be popular, there may need to be a release time to when the position can be posted to be open. Although it is nice to have many to choose from, if there are too many, it can be more challenging to review each one with the same care and attention. Quality vs Quality is vital in these situations. There can also be issues in the event if there are too few applicants. This could be because the answers to the questions above were not properly answered. Going back to see where they could be tweaked is usually better than sitting on the current strategy. [2]

- **Categorise Applicants into A and B** : Having a list of applicants can be a daunting task to go through. Having the hiring manager ensure the minimum requirements set in place when answering the question 'whom to recruit? (placement)' is the best foundation. Knowing who is above or below such requirements is key in separating the list. Selecting those who meet requirements into one pile 'A' and the other into 'B' for those who do not, is a great systematic approach to spend more time and attention on those who do meet them. If pile 'A' is still too large, more requirements can be made by the hiring manager to help limit the number. [2]

- **Interview Candidates** : Although someone may look good on paper, human intuition is still one of the best tools to use during the hiring process. Depending on the position and the company, there can be up to five interviews. These can be based on anything from general knowledge of your skills, the company, demonstrating your past work to seeing how you work in various scenarios. Usually, the first one or two are based online, and the latter ones may be held in the companies office. These interviews are also held by multiple individuals. They usually include the hiring manager, potential other team members and possibly heads of the departments. Getting to know more about what the company is like but also who the applicant may be working with if they were to get the position. [2]

- **Skill Test Assignment** : Depending on the level of the position itself, an applicant may be asked to come in or have a take-home assignment. This is not only done to test the individual's skills but also view more into how they approach different problems. Problem-solving is a crucial skill, no matter the position to any company. [2]

– **Decision** : Relying on all the stages above, in conjunction with intuition, the correct applicant meeting the criteria the best will be chosen, and an offer for the position will be made. In the event that none of the candidates meets the criteria, the search for the right applicant will continue. This could be with keeping the current strategy or going back to the questions to tweak the approach like mentioned before. [2]

Although this process seems to be very lengthy and includes many stakeholders, it is essential to define everything before getting the 'ball rolling' on the search and having the right strategy and process in place can help when needing to go back to redefine something. Realising how important this was within the recruitment process, this recruitment research topic also needed a strategy and process to help keep things on track and filter out the unnecessary pain-points. After looking into various user-centred approaches, I chose to look more into Design Thinking and set up the research following the methodology.

3.2 Design Thinking

Design Thinking is a methodology that is on the rise today in order to gain a new angle to problem-solving [51]. It focuses on being a "human-centred approach to innovation that puts the observation and discovery of often highly nuanced, even tacit, human needs right at the forefront of the innovation process" [34]. The methodology is mainly praised for helping create innovative solutions to many complex problems [12]. Many companies are using and or tweaking the process in order to fit their needs to gain a better understanding of where they could do better. One company who is exceeding exceptionally well at this is IBM [17]. Although they have renamed some of the stages, the main goal concerning the ability to enhance the outcome, while keeping innovation at the forefront, remains the same. In the means of this thesis, the original six-step process is used to discover more of the issues and possible solutions for that of recruitment.

Design Thinking as a whole cannot be seen as a linear process. Many take a step by step approach with the end goal in mind. With Design Thinking, one is expected to be able to transition between stages to ensure that they have 'pushed the limits' of each and there was not something missing [34]. Using this selective focusing, in the beginning, can help pave the path for those wanting to discover pain-points while keeping the user in the loop and using their knowledge to their best understanding.

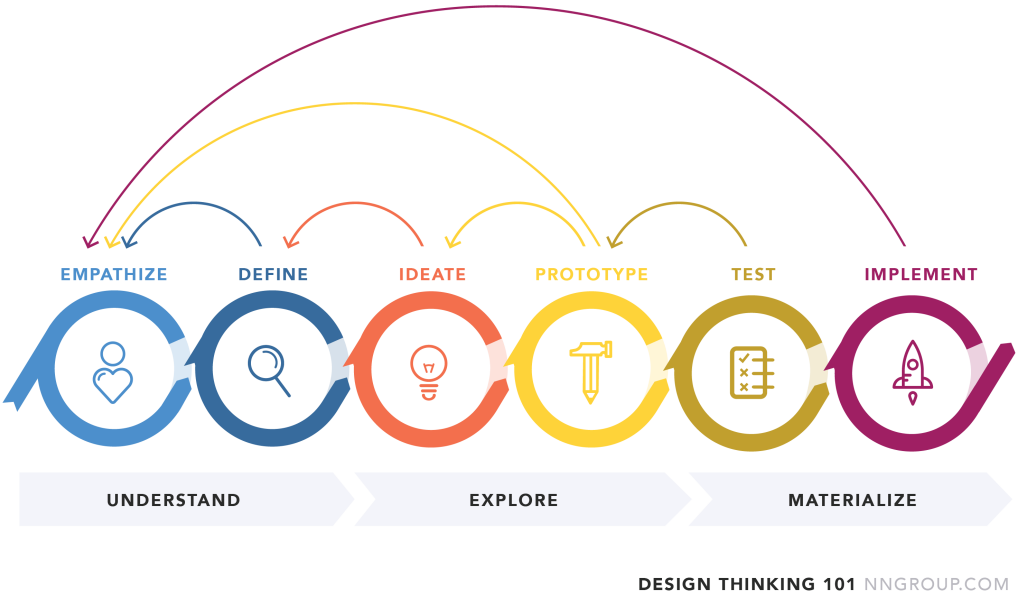

Figure 3.2: Design Thinking Process Guide [27]

Design Thinking is broken up into the following phases with two stages comprising each of the phases [51].

1. **Understand:** - Empathise and Define
2. **Explore:** - Ideate and Prototype
3. **Materialise:** - Test and Implement

Each of these phases is meant to go into more detail in order to ensure that the researcher is able to fully gain every angle with the user and their needs in mind.

The *Understand* phase is broken down into the Empathise and Define stage. This is a section in DT that not only takes the most time but requires the most detail. Having a solid foundation of the current ways of working and talking to individuals in direct contact with what you are trying to gain more knowledge, is aiming to work toward a plan with more structure and influence of innovation [12].

Empathise is about learning for the audience that you are targeting or designing for [27]. It can be seen as one of the most scientific stages as the root foundation is to understand the problem to which you are trying to find. This could be done using many different approaches such as consulting the experts in the field or topic, taking a 'safari' of the environment to which the issue 'resides' and even working with a group to get various angles and observations through multiple lenses [78]. This stage allows those using it to gain insights into the needs of not only the issue but also those using it. It also allows users to set aside their assumptions and learn from those surrounding the issue at hand. During which, the observer will collect a substantial amount of information which will be carried on use within the next stage.

Define is the next stage which allows the user to take the information gathered from the stage prior, empathise, and begin to scope a framework on how to approach it [27]. This can be one of the most time-consuming stages as all data must be analysed, evaluated and ordered to set a path on where to begin during the next phase. Many times observers may think that enough data has been gathered, but once things are gathered and ordered in a manner with the user in mind, it is noticed that there are portions missing [27]. In order to combat this missing data, observers will need to go back to the empathise phase in order to ensure they have a full understanding. This is not seen as a failure in any way as DT is founded in not being a linear process but rather a looping thread helping to create innovation [51]. Once the correct amount of data has been gathered, and all pain-points and or characteristics of the situation have been laid out, the creative process can begin.

Explore is the next phase where the observers' creativity can come to life. It is broken down into two stages of Ideate and Prototype [27]. Having ideas from traditional to exorbitant is the balance a designer needs to strive towards during this phase while keeping the needs of the users in mind.

The *Ideation* phase is where all the information that has been collected and filtered from the previous stage is analysed to help spawn creative and logical solutions [27]. This is done with the solution being framed to solve and improve the needs of the users. The Ideation stage allows for brainstorming famed exalted in an alternative manner to solve normalised issues. An analysis of current market trends and early adoption strategy is a useful tool for this stage for further validation of an idea at this point [27]. This is a

stage where no ideation should be viewed as a wrong or illogical solution as they could spawn an innovative and disruptive solution. Very much along the lines of 'no question is a dumb question'. By the end of this phase, the designer should have at least two reasonable ideas in place to help solve the problem.

Prototyping is the next stage which allows ideas to come to life. This allows for the creation of inexpensive and quick products to be built. Each prototype allows for different angles of the problem to be solved. Many times a combination of various prototypes is the best solution to meet not only the needs of the users but is the most innovative [27]. This is where a hypothesis can be front in centre in order to test in the next stage.

Testing is one of the most crucial parts of Design Thinking. It allows for the validation of a concept created during prototyping [27]. It allows the designer to view whether the prototype solved and handled the problem and needs to define from the user analysed at the beginning of this process. It allows for refinements of a prototype and ultimately an end product that meets the needs of the user. It can also confirm to a designer that a prototype is not a valid solution that meets the needs of the user [51]. This is part of the process and improvements can always be made. As mentioned earlier, DT is not a linear process and steps back a stage or to the beginning is not seen as a failure but more towards discovering and defining further the needs of the users [51]. This can be carried out until the needs and problems of their users are met and validated.

Implementation is the final stage where the prototype is build to full functionality required to meet the complete needs of the user(s) [27]. It will then be administered into the process ready to aid the frustrations of the past.

3.3 Chatbots

When it comes to the term chatbot, many individuals think of the voice-based versions. These can include many that are very prevalent in homes and offices today, like the *Google Home* or *Amazon's Alexa* [16]. This is partially due to the fact that they have in fact been designed to be something similar to that of text-based versions, just with different technical engineering or architecture [16].

For the research conducted in this thesis, a chatbot is defined as 'a service, powered by rules and sometimes artificial intelligence, that one can interact with via a chat interface' [71]. The chat interface of this thesis will be available for access and interaction via a link provided in Chapter 6.

3.3.1 Chatbot Platforms

In the digital world today, there are various platforms to which chatbots can be accessed. Many of these platforms not only messaging app-based but are some of the worlds most used daily. Examples include *Whatsapp*[1], *WeChat* [2], *Facebook Messenger* [3]and *Slack*[4]. Many of these interactions are encountered via a multitude of devices with varying dimensions. If we look more into the number of bots that are present on such platforms, we can see that Slack has nearly 20,000 bots present on its platform for it is nearly 10+ million users [73]. One of the world's most popular messaging platforms, Facebook released their chatbot platform for anyone to use in 2016 [23]. This allowed companies to connect with their users on a more common platform, allowing them to automate more interactions via chatbot. With 1.3 billion users, Facebook allowed companies to also build personalised experiences based on their users [40]. Today there are more than 800 million messages between companies and people every month [20]. This conversion rate is a clear indication that there is not only a preference to communicate in this manner but shows that these custom-built experiences are the way to engage with such users [23].

[1] `https://www.whatsapp.com/`
[2] `https://web.wechat.com/`
[3] `https://www.messenger.com/`
[4] `https://slack.com`

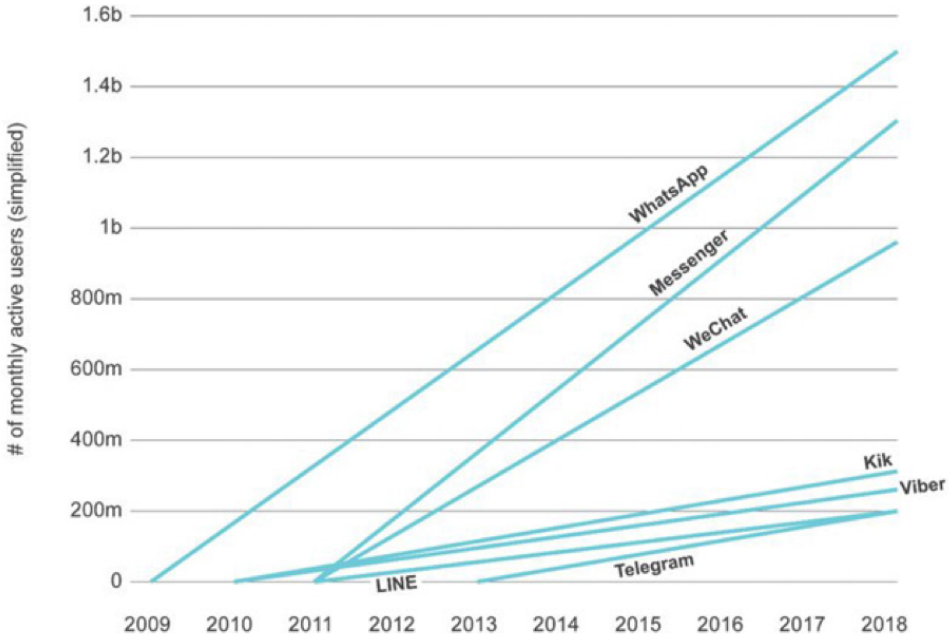

Figure 3.3: Messaging Applications in Numbers [7]

Looking deeper into the numbers of applications, Figure 3.3 shows the top three most used messaging applications: *WhatsApp*, *Messenger* and *Wechat*. The application from *Facebook* can also be seen to have the highest percentage of growth in comparison to the top application, *Whatsapp*. It is expected to exceed the usage of users in comparison to Whatsapp by 2021 [7].

From a similar study, it was noted that in 2015, messaging applications surpassed that of social media applications, as seen Figure 3.4 [7]. This trend is expected to continue within the next ten years with the decrease of social media usage [7]. As stated earlier, in 2016, Facebook gave its chatbot platform open rights to the public [24]. The continuous increase of growth of messaging applications users in comparison that of social media is, in part thanks to this adoption of other chatbot integration and implementation from other competitors like Slack [25].

This has allowed companies to reach out to more users with just one platform in comparison to multiple channels, and in many cases, is actually better than their own application. Most users only access 15 percent of their applications on a daily bases [25]. With limited storage on such devices, users are less

likely to make room for a companies application and would instead use that storage space for something more meaningful, such as their photos. They want to be able to connect with companies familiarly and efficiently with applications that they already have.

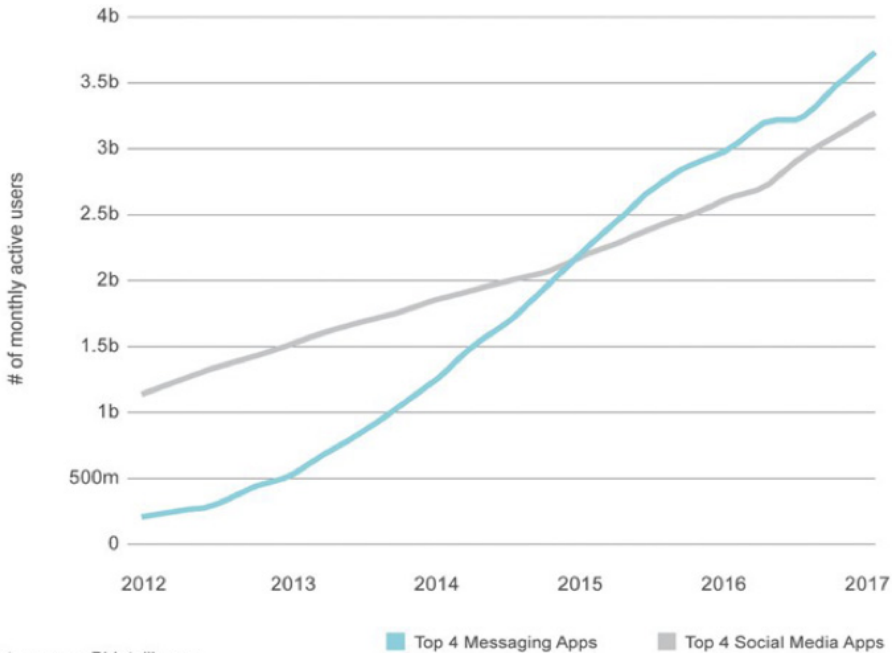

Figure 3.4: Social Media vs. Messaging Application [7]

Seeing that messaging applications have overpowered the user rates of social media, it is evident that messaging applications is how people wish to communicate, specifically in the realm of text [25]. Future conversations will follow such trends and having chatbots, or other conversational interfaces can only help influence and strengthen new means of communication. With many industries already beginning to use chatbots, as seen in Figure 3.5, our ways of communication with companies have already begun to push towards messaging bots. They are predominantly used in these industries as users want and expect to locate an answer at a favourable rate and ensure that it is reliable [21]. Using conversational interfaces, these industries have simplified not only the communication with their users but the mobile messaging platform . [32]

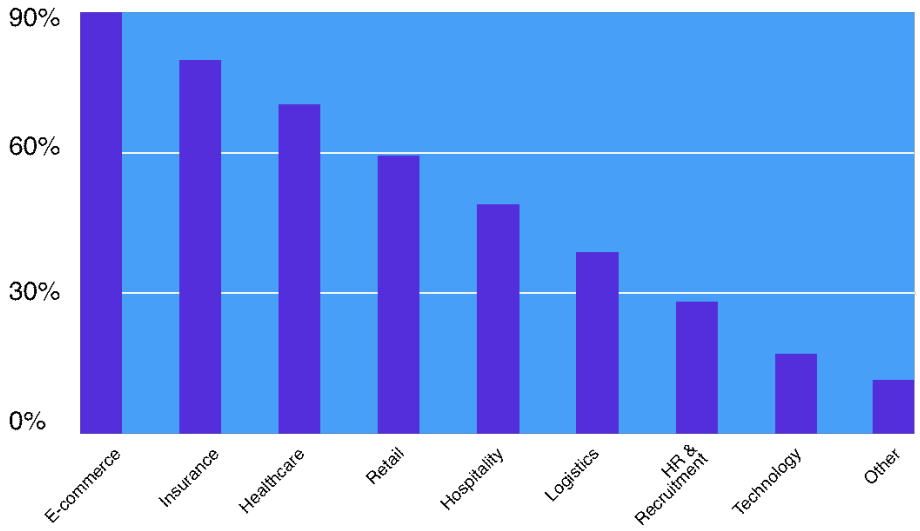

Figure 3.5: Industries Using Chatbots [10]

3.3.2 Industry Chatbots

With the ease of communication between individuals becoming more convenient and more natural online via these messaging applications, the means of communications with companies and individuals are still stuck in the past. Applicants are often unaware of the process timeline but also where they are within it. Many are also unaware of how their data and information is being stored as companies are not always clear to how they are keeping things safe [77] .

In an early chatbot report done by McNeale and Newyear, they define one significant benefit of using chatbots via messaging application to provide information to users [82]. As chatbots are designed as a conversational interface, they are not as influenced by tones or requests from the user. This means that they cannot get annoyed by various requests asked in a rude manner or in repetition [1]. Whatever manner and attitude it was designed in, it shall remain in this manner — allowing the chatbot to remain patient and no offended. This is key for when applicants may be dissatisfied with their lack of awareness during the process timeline and may have biased behaviour while communicating with the chatbot [1].

With a percentage a little below 30 percent of the HR and recruitment industry starting to use chatbots, as seen in Figure 3.5, how are the current chatbots helping the industry [57]. Some examples currently in development or already implemented are as follows [26]:

- A machine learning consulting company called *Loka* [5] has developed a chatbot specifically for HR staff, named *Jane*. This was developed to 'free up' time of HR employees and give employees direct access to a resource with all the information in real-time [83]. No more having to wait for a reply via email when the HR employee has time, other employees can ask the bot questions 24/7, allowing them to get the answers right when they need it [83]. As it is a machine learning consultancy, *Jane* was developed to learn over time with various request to help better answer questions.

- A company called *ADP* [6] has used its advantages of messaging applications allowing for their payroll innovation chatbot. They utilise *Slack* [7] and *Trello* [8] order for a company to easy access payroll information from anywhere [8]. They also have two other chatbots in development to aid with delivering job descriptions and other relevant information to potential hires and to aid existing employees in the use and timeline of their holidays days for the year [8].

- Chatbots are also being created to help with sick and absent days. A large retail company called *Overstock* [9] has helped its employees streamline their request and notification of a sick or absent day [59]. They have created a chatbot named *Mila*, for employees to chat with informing her of their absence from the office. *Mila* can ask simple questions and relay them to the correct manager needing the information. This allows for easy access from not only the manager but also the employee. Neither of them are having to make a call or listen to a message when they cannot be reached. *Mila* is available 24/7 allowing the request to be made at any point of the day [59]. Relieving the frustration of out of business hours call or coordinating a schedule to ensure the individual is available to receive the call. *Mila* has been further developed to schedule time off, check your schedule and perform any other task typically requiring contact with a human [59].

[5] `http://www.lokaconsultancy.com/`
[6] `https://www.adp.com/`
[7] `https://slack.com/intl/en-fi/`
[8] `https://trello.com/enin`
[9] `https://www.overstock.com/`

- *Leena AI* [10] is an artificial intelligence (AI) powered Human Resource assistant, helping to automate and improve the employee experience. *Leena AI* was designed to help in multiple areas of Human Resources and recruiting [56]. It aims to help with employee on-boarding, on-boarding, Human Resource ticketing and frequently asked questions. Like ADP, *Leena AI* can be incorporated into a multitude of messaging channels, like slack and Microsoft teams. With a current job market being in the control of the candidate, employee experience is at the epicentre of many companies digital transformation. *Leena AI* is using the advantage of the latest technology to have instant responses, personalised experience while ensuring the conversations are secure and concurrent [56]. Their main goal is to improve the employee experience over the entire employee lifecycle vs just applying to one sector of the life cycle [56].

- *Mya* [11] was the first-ever chatbot developed solely to help automate the recruitment process [39]. It was developed by a company named *FirstJob* and 'claims' to automate up to 75 percent of the process [39]. It claims to aid in job searches and business in general [39]. It is geared towards firms that are solely based on recruitment and finding the right people for various positions within various companies, i.e. recruitment companies. Similar to *Leena AI*, it is based on AI as well as natural language processing. *Mya* aims to keep the connection alive between recruiter and applicant [39].

- *PWC* [12] Sweden's chatbot *Jobbot* [13] was developed to answer questions typically asked before an applicant applies. It was one of the first projects based out of the new Human Resources Tech and Innovation lab that aims to improve the recruitment process with innovative tech solutions [41]. *Jobbot* is currently based on one channel, Facebook Messenger and aims to connect with individuals who are recent graduates from university to join PWC. This target market primarily asks the most questions to the HR department as they are the most unfamiliar with the process. They have chosen to keep *Jobbot* exclusively to this channel based on the target market but do plan on expanding the scope to where *Jobbot* could help within the recruitment process [41].

[10] `https://leena.ai/`
[11] `https://mya.com/`
[12] `https://www.pwc.se/sv.html`
[13] `m.me/pwckarriar`

Within HR, as we can see in the industry examples, many chatbots have been developed to help with a multitude of issues within the current working system [43]. From the performance and integration of such chatbots, it is a prime example that this way of communication is effective, efficient and reliable for the user to receive the information that they are out to get [32].Within companies, this way of communication is vital to ensure that time is being spent on more meaningful tasks. This is also in part to the fact that many companies are multinational and co-collaboration is apart of their everyday culture [14]. Online communication may be required to gain access to Human Resources, especially for those who are working remotely. As we can see in Figure 3.6, nearly 40 percent of teams, someone is working remotely [14].Communication to those individuals, no matter what timezone they are located in, is necessary for full transparency.

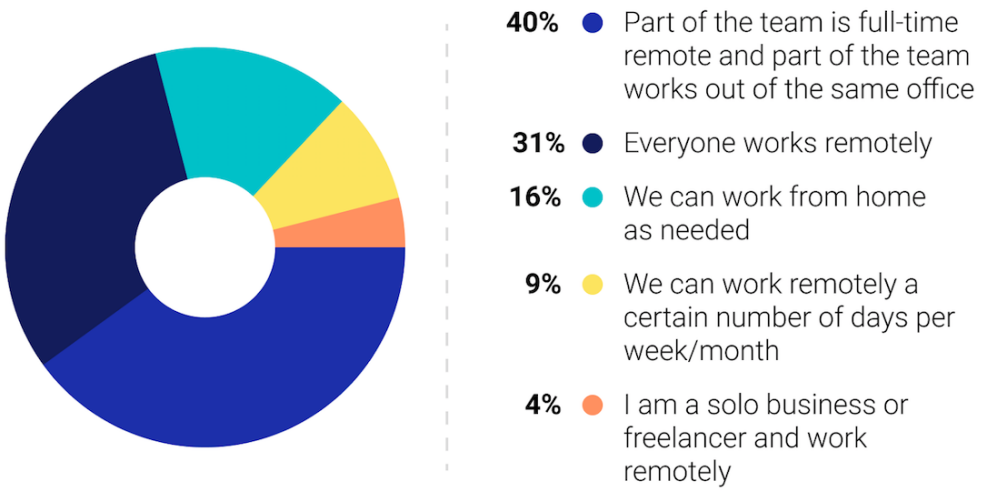

Figure 3.6: Companies Stance on Remote Work [14]

3.3.3 Lack of Focal Points

As seen earlier in the chapter, there are many spots within the HR and the recruitment process where chatbots have either been created or implemented to help bridge the gap in communication between employee/ applicant and the information that they need to know [45]. A deeper understanding of a further potential pain-points will be to be researched to ensure this is a viable area for aid.

Based on the foundation of traits gathered from the chatbots listed above, one can see that there is a need for the following focal points:

- An effective & efficient way of gathering correct information : This will ensure that the information the user needs, whether it be for applicants: Do I need to speak Swedish for the roll or only English ? or for employees: What do I do when I am sick? Allowing this information to be accessed at any point of the day will allow for a better user experience, as the chatbot and ultimately, the company, can provide information to all employees any time of day. [45]

- Ease and productivity : Tying into the last point, users need to be able to get the information when they need it and not have to wait for the answer from HR via email like before. Having information quickly accessible allows HR to be more productive with other tasks at hand. This can reduce or eliminate stress and friction frequently caused by mundane and repetitive questions. [45]

- Transparency of information : Users need to be aware of where information is and how to access it. If there are details to their personal information for application purposes, the company should be sure to show how and who can access it. [45]

Keeping these points in mind, research that is more-in-depth of the current working ways of the recruitment process is needed to locate, define and idea a possible solution with a chatbot. With the examples above, one can see that with the keys defined above being kept in mind for a pain-point in the system, chatbots are definite contenders to push towards automation to help relieve areas of frustration.

3.4 General Data Protection Regulation (GDPR)

In 1995 the Data Protection Directive was developed to help regulate personal data handed in by an organisation or individual and provide protection to these rights regarding personal data by an EU citizen [29]. Wise words, especially from twenty-two years ago but as information has become the newest form of a commodity; more regulations are needing to be put into place to ensure better protection. This is in part to the growth and easy accessibility of not only storage but also the processing power needed for various analytics that has turned the data into such a commodity [6]. With such advancements, more regulation needs to be completed in order to ensure that the regulations are meeting the rates and needs of every growing software.

> *'Technology has transformed both the economy and social life, and should further facilitate the free flow of personal data within the Union and the transfer to third countries and international organisations while ensuring a high level of the protection of personal data.* - Regulation 2016/679/EU Recital 6 [37]

The principal goal stressed within GDPR is that of minimising the amount of data collected not only by an organisation and also by defining the length of time the data is to be kept for [29]. At a glance, this seems to be an improvement from the Data Protection Directive set in 1995, as mentioned above. Looking further into the various legal requirements within the articles, there are some potential vague and not as defined timelines for keeping such required data. Specifically, within Article 5(e), it states that "personal data shall be kept for no longer than is necessary for the purposes for which it is being processed" [37]. The ones determining how long 'necessary' is, is that of the ones storing that data. There are some select exceptions to this case, however, but is more in terms of scientific or historical research purposes or achieving with the purpose of the public interest [29].

In order to try to help data controllers or organisations define such a fundamental purpose and timeline, recital 39 has been developed for further definition [37]. It states that "the period for which the personal data is stored should be limited to a strict minimum and that time limits should be established by the data controller for deletion of the records (referred to as erasure in the GDPR) or for a periodic review" [37]. This recital should help limit what data is being kept and for how long. Many corporations are

defining such timelines with the creation of a Data Controller Officer [84]. This individual will ensure that the correct measures are being taken. In the event that the data is not necessary any longer than what it was declared for, the information should be deleted or anonymised [84]. This is how many organisations are able to keep and process personal data for longer than an intended period of time with still complying with that of GDPR regulations (Regulation 2016/679/EU art. 5,) [37]. This information does, however, need to be agreed with the individual whose data it is prior to action. For those individuals whose information was already with a corporation, many just sent an email informing the individual of the companies new GDPR regulations [29]. This is very similar to that of updating terms and services. Although a simple solution, it is not necessarily the best practise or the most transparent for the user. In terms of new data collection, the trend seems to be in favour of keeping the details of the regulations within that of the terms and conditions page.

With GDPR regulations being that of something new to corporations and EU citizens, having a transparent way of displaying this information is vital. This is especially the case for those countries with citizens who are more reserved with providing personal information [29]. Companies are treating this new regulation with methods that are not meeting current trends. Looking into a report carried out that compare phone call, email social media to that of real-time messaging, we can see that by 2017 90 percent of individuals not only want but expect to be able to talk to a business through messaging and 66 percent of them actually prefer this means of communication [80]. Dissecting the types of individuals who were apart of this study, it was noted that individuals twenty-five to forty-four spend twice the amount of time using messaging applications vs email applications. Ages thirteen to twenty-four spend eight times as much time using them[80].

If an organisation wants to be transparent with these regulations and demonstrate what means and practices are being used to help protect their user's data, then they should be reaching out to their users with the least amount of friction. As mentioned, we can see from the study that users not only expect to be in contact with companies via messaging applications, but email, phone calls and social media have become a thing of the past [80]. This is due to years of abusing these main traditional channels. People, marketers and salespeople have been slowly waking up to this new reality - one where users have grown sick of being bombarded with irrelevant and annoying phone calls, emails, and or social media messages [9]. The market needs to catch up with the trend in order to offer its users full transparency with a solution

that is already familiar to them. Using a chatbot via a messaging platform to help companies ask, comply and educate users about their data practices is vital in moving forward in their current data-driven time.

Chapter 4

Methodological Approach

This section will cover how the design thinking process was utilised for this thesis to gain further information of the current gaps or pain-points in order to set up the ideation and creation of the chatbot for success. Following with more technical approaches to how the chatbot prototype platform was chosen, the user experience and usability measures as well as the 'personality' given to the chatbot prototype

4.1 Research Design with Design Thinking

As mentioned in Chapter one, design thinking is a user-centric methodology pushing the innovation envelope when used to help solve problems [51]. It is the leading framework for discovering and peeling the layers of the recruitment process and discovering a primary pain-point (re-engaging with past applicants) and how the integration of a prototype (a chatbot) meet the needs of the stakeholders discovered and relieves the frustration of the current process. It aims at being problem-focused, once reaching a level of understanding from the processes or environments very users.

Gaining a better understanding of the recruitment process from both recruiter and applicant side was done via the Empathise phase and helped define the first research question in conjunction, influence the second ones. Further Definition, Ideation and Prototyping was carried out to address the hypothesis mentioned in Chapter 2. During the Testing phase of the prototype, the data collected will allow for a further analysis and validation of whether the hypothesis is null or valid.

Delving more into not only current solutions, but also relevant literature, were essential steps in building a foundation of the current system, working ways and other technologies out in the market. This helped formulate enough knowledge to formulate a realistic plan to answer the research question, in result, validating or rejecting my hypothesis. Interviews were also conducted with both stakeholders to elaborate and build what was researched from relevant literature.

Once Empathising, Defining and Ideating, a chatbot prototype was created to help meet the needs set during the Empathise phase. The prototype of potential solution's technical needs, choices and personality for specific user experience will be discussed in this chapter, in order to ensure various reasons for various setup decisions before carrying on throughout the thesis.

A Testing phase was implemented after the creation of the prototype in order to analyse the concept. This includes a round of interactive testing with two versions of evaluation in means of a user test and post-survey to gain more tangible insights. This information was later gathered and measured to further validate the null or confirmation of the hypothesis and research questions. These measurements were gathered in both qualitative and quantitative ways.

Qualitative research was carried out with think out loud usability test and free comments when answering the completion survey [4]. Having this type of research allows for a deeper understanding into not only the working-ways but also the motivation of the user during the usability test [72]. It can also be used as direct feedback on issues that arise during testing that can be actively used for future development towards the prototype [72].This is also where users can comment on their visions and ideas for betterment that could be later enhanced in future ideations for possible solutions towards various issues, allowing direct feedback.

Along with the following research, quantitative research was conducted in multiple ways. Trichotomous questions were asked alongside the use of a Likert Scale [52]. This means of measurement is based on a level scale, that of 1 to 10. It is one of the most widely used approaches for survey research responses, often referred to as a rating scale. Having a Likert Scale in survey research allows for options and results to not only be measured in a generalised way but also in a quantified manner [52]. Using this measurable data in means of quantitative research allows for the suitability of the prototype to be calculated whilst formulating facts to help support the or lack of suitabil-

ity [52]. The survey mentioned in this form of research was conducted right after the usability of the prototype to ensure direct and fresh feedback could be given [22]. This was also to ensure that the users did not conduct this in a rush or pressured manner as it was introduced as part of the usability test [22].

4.2 Empathising with the Current Recruitment Process

As mentioned in the introduction, the empathise stage about learning for the audience that you are targeting and designing for. It was essential to carry out many interviews with various recruiters to gain a better idea of how their current workflow or process is carried out. This would help gain direct knowledge not only about outlying stakeholders but also understand the issue(s) at the very core.

Gathering a list of names from various sectors of business, interviews were possible with 17 recruiters. As Deploy is based in Stockholm and myself in Helsinki, I spoke to recruiters primarily within the Nordics based on convenience and the current target market, as a digital transformation is already beginning within such markets [15] [74]. The interviews were scheduled for an hour via phone call.

The discussions were very informal, but all carried the four similar topics:

- General information about themselves and current workplace.
- Description of their environment at work (working as a team, solo ect.)
- Current work and recruitment process and about any technical aid.

From these initial interviews with three recruiters, a flowchart of the process was created to help carry on the rest of the interviews.

Using this as a base for the following interviews was much easier to gain an idea of where there was actually more interaction with other stakeholders, such as the hiring manager, existing employees and candidates that were already on file. During the following interview, the recruiters were able to tell me what was potentially missing from the chat or where something needed to be elaborated on. From further interviews with seven other recruiters, the flowchart transformed into something much more complicated than the initial chat creation.

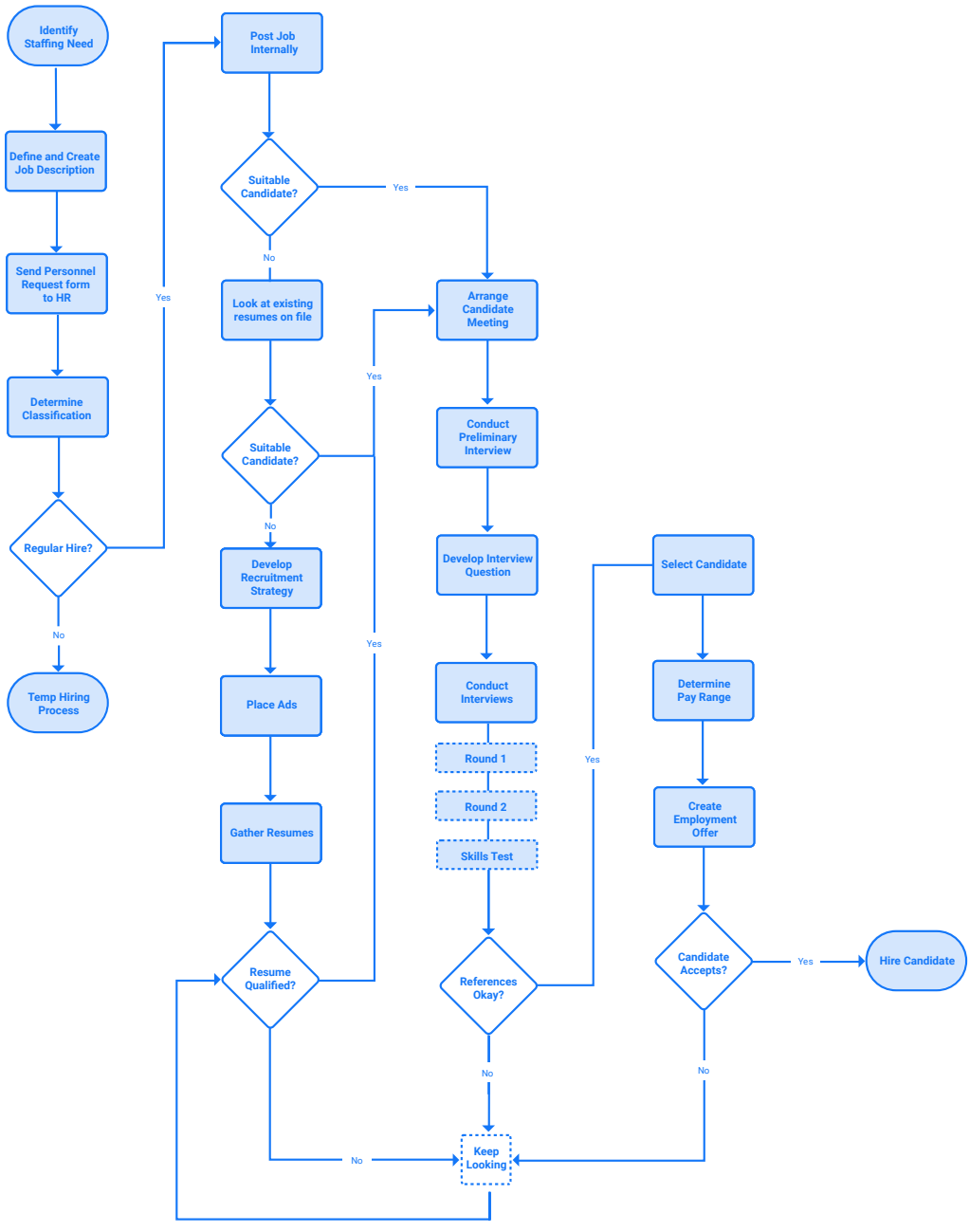

Figure 4.1: The Actual Recruitment Process Flow

With the remaining seven recruiters, the interviews followed the general four themes listed above but also included more questions on where they are feeling overworked, frustrated or tired of the current working ways. Figure 4.1 was one of the most useful tools to allow the recruiters to pinpoint precisely where the majority of their frustrations lie and give more reasoning behind it. These points and reasonings will be discussed in more detail during the 'define' section soon to follow.

Interviewing individuals who have been or are current applicants was the next step in viewing the other angle of the recruitment process. Interviewing individuals from various fields, I was able to carry out 20 interviews with six of the participants being currently in the recruitment process with multiple companies. There were many common trends within the group of applicants. They are as follows:

- Looking and finding the job first and then learning about the company second. This theme is making the current job search market more in favour of what the company has to offer the candidate more - a candidate's market.
- Where to recruit? (location)
- There is more focus on what the company can offer them versus their competitors - What would the perks of working here be?
- During the application process, how in the loop am I kept? Applicants noted that there was a lot of effort and time put into the application and they expect the employers to treat them with the same amount of respect.
- Reading is okay, but visuals are vital in gaining my attention. Companies that are using *Team Tailor*, *The Hub* and *Joblyon* have a better advantage as they are showing the applicants what they want to see versus a traditional job description.
- Sixty percent see themselves are job hoppers. They see no issue of switching companies within 1-3 years and would probably change rolls by 2022.

Using Figure 4.1, applicants were able to point out where their point of interaction was with the recruiters. As with the recruiters, it was easy to get the applicants talking about were within these overlapping points caused frustration.

It is clear to see that within both sides of the recruitment process, there were a lot of overlapping frustrations and clear definitions of the problems.

4.3 Defining the Current Pain-Points

As mentioned in Chapter 1, the Defining phase allows the user to take the information gathered from the stage prior, Empathise, and begin to scope a framework on how to approach it. Taking the information that was gathered from both applicant and recruiter, there are clearly two main points in which is causing much frustration. Founded on Figure 4.1, Figure 4.2 has the two red boxes with the two most common pain-points.

The top two pain-points discovered during the empathise phase are as follows:

1. **Posting the Job Internally:** Many recruiters noted that this varies much between companies. Some use email, an external portal or post it somewhere within the office. This is not the most transparent way for applicants or employees to reach this information. Employees get many emails a day and often this information can be overlooked. This is also the case for posting the information via another channel. There are so many channels used within the workplace from reporting hours and reimbursements to sick and holiday leave; employees do not need another platform; they need the information. Allowing growth within a company and showing how that can happen is a great way to retain individuals while validating to applicants why where they work, is a great place to work.

2. **Looking at Existing Resumes or CVs on File:** This stage comes with two complex issues from a reciters point of view.

   (a) ROI and Time: With many applicants for one placement, there are only a few who make it to the final stages. Much time and effort is made by the recruiters and other stakeholders through interviews and skills tests. Applicants not only put in effort with their application but also when demonstrating that they are the best for the position. When an applicant is not the top choice for the position, many agree to keep their data, such as CV and contact information in case a position opens up at a later time. If the same position or similar becomes available, the recruiter

needs to search for those past applicants information to inquire the following information 1. What is their current search status? Active: yes or no 2. What information has changed since applying? (skills, education level, field of interest updated CV) Once this information is received, the recruiter will check if the updated information from the applicant fits the needs of the position. If so, then a call or further interview will be scheduled to judge the fit.

(b) Transparency of Data: As mentioned above, most applicants agree to keep their data, such as CV and contact information in case a position opens up at a later time. Within the EU new regulations have been set under the name of the General Data Protection Regulation (GDPR). More details of the regulation can be found within the introduction chapter. In short, the regulation "personal data shall be kept for no longer than is necessary for the purposes for which it is being processed". Complying and being transparent with one's data is necessary and a challenge many are facing with applicant's data on file. Gaining consent can be a challenge with email being the means of communication and is not the most transparent to the applicant. Recruiters also mentioned that when asked during interviews many applicants, specifically within tech and IT related positions, ask how the company is keeping their data safe and complying with GDPR regulations.

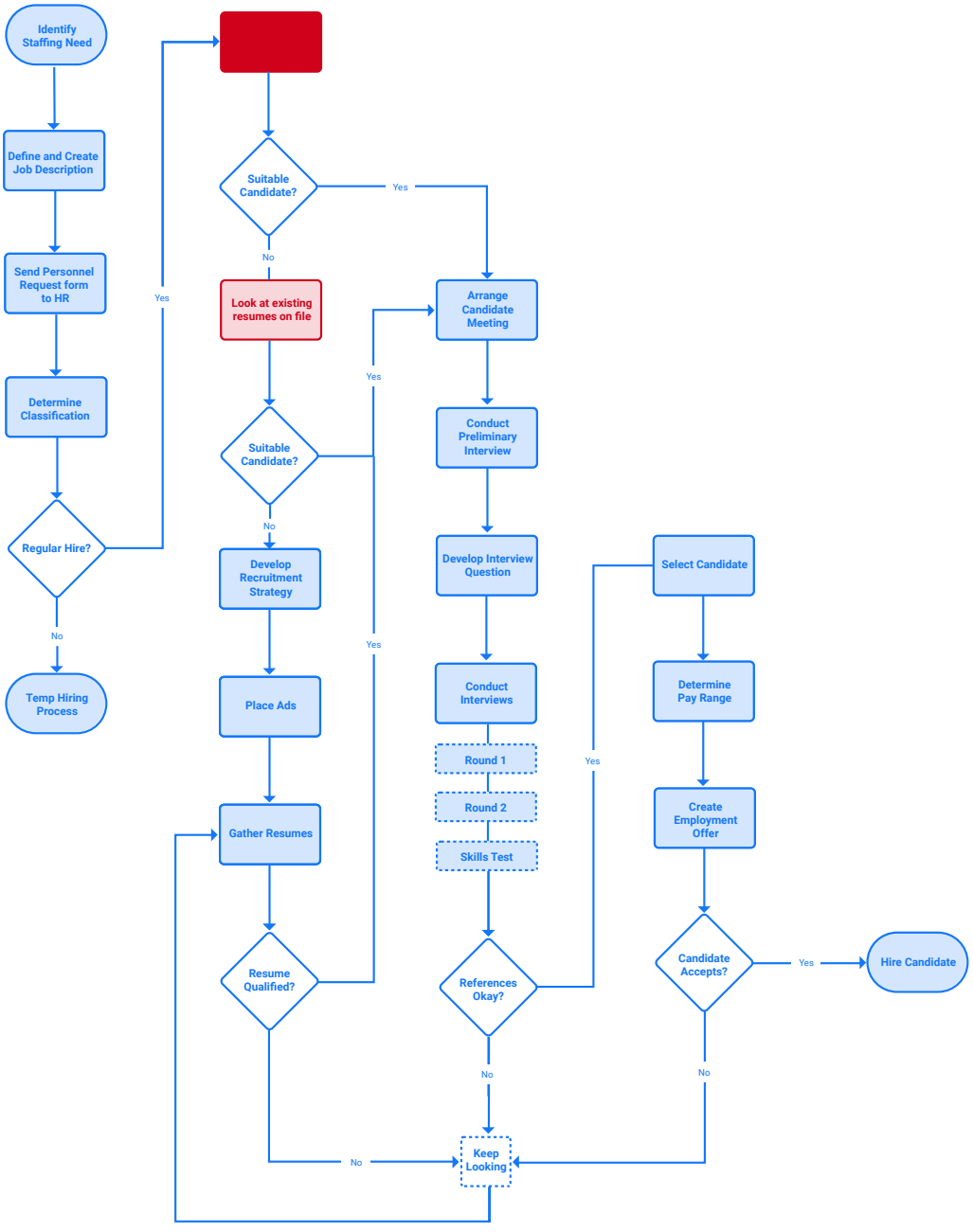

Figure 4.2: Pain-Points within the Recruitment Process

When interviewing recruiters, there was much more frustration and help demonstrated towards that of the second pain-point, looking at existing resumes or CVs on file. They mentioned that with GDPR being something that they now have to comply with and ensure that the applicant is aware of this, it is much more work for them on top of their other responsibilities throughout the day — adding more work to the same amount of hours [50]. The pain-point of understanding the further needs of not only the recruiter but also the expectations of the applicants from a candidates market will be used during the remainder of the thesis.

4.4 Ideation of a Chatbot for Re-Engagement

4.4.1 Chatbot Adoption

During the interview with recruiters, many of them said that reaching out to applicants via email is the primary way of communication. This tends to be an issue when individuals have either changed personal emails or have applied for a position through their university email. Communication with them about a new opportunity or to communicate about their GDPR compliance can be not only a challenge but a frustration, especially in a no-reply or late reply instance. Looking further in the advantages of a chatbot, the State of Chatbot Report from 2018, we can see the direct advantages of chatbots versus email [10] [55]. The advantage for a company to communicate via chatbot versus email is unparalleled. Not only is the experience and convenience more significant, but there are other benefits not even imagined with email, such as 24-hour [75]. More benefits can be seen in Figure 4.3.

Having also completed and implemented a chatbot into the engagement stage within a large Swedish consulting firm, we know that applicants are adopting this means of communication and is starting to become that of a new norm. Seen from Figure 3.5 that the adoption of chatbot communication has taken over in the sectors of E-commerce, Insurance and Healthcare. Although the adoption within the recruitment sector is not as strong, being a little below 30 percent [10]. This percentage can still be seen as a stable market entry point for this implementation.

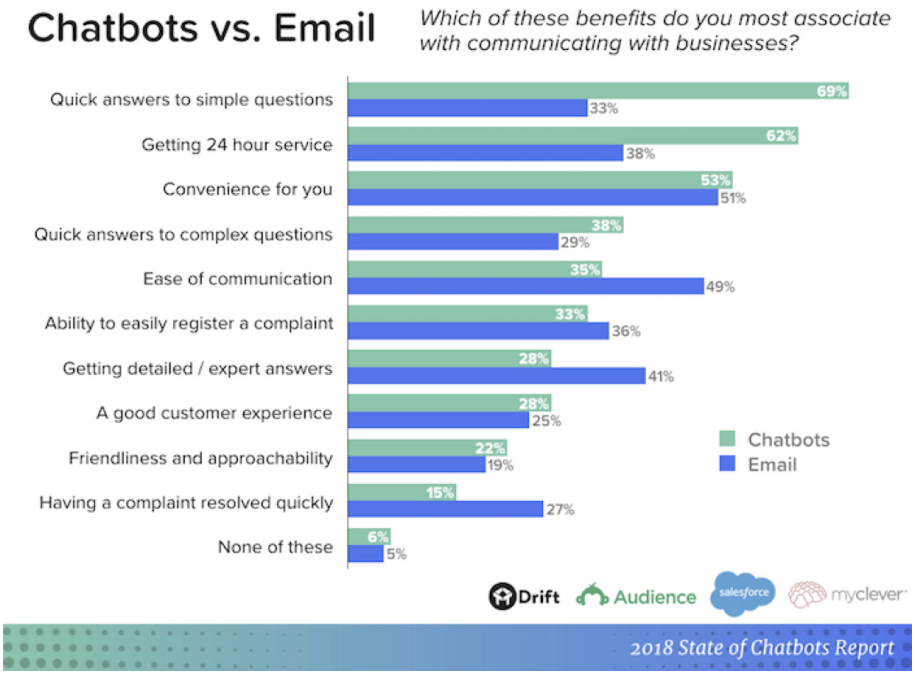

Figure 4.3: Chatbot vs. Email [75]

Within business, there is a timeline of where one wants to begin to incorporate technology and how the adoption of the technology will be handled. Looking at the technology adoption graph of Figure 4.4, two factors need to be considered; maturity of the technology and the amount of time. If the technology is too new and one releases it too early, then one is considered to be in the 'danger zone' [47]. This means that the market is most likely too premature to introduce a product on the market. The same goes for if the technology can mature, but one has waited too long to put it out on the market, and there are already too many comparables out there [47]. The technology or product is too standard and similar the other competitors on the market [47]. Where one wants to be is in the middle of these two, the market has some foundation of the concept and not too much time has passed since the concept first hit the market. This is precisely where the recruitment sector is [10]. There is enough knowledge or maturity of chatbots in multiple other sectors that people are aware of the technology and adopting it, but the push and norm also needs to be seen within recruitment [35].

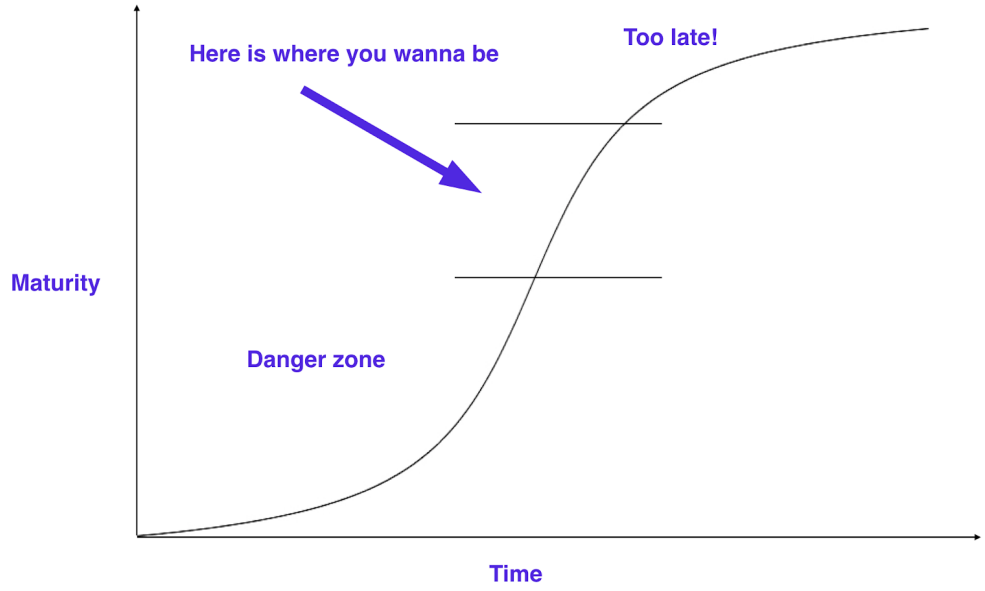

Figure 4.4: Technology Adoption [47]

4.4.2 Chatbot Target Information

From this knowledge and competitor listing in the introduction, the continuation of how to incorporate a chatbot to help relieve frustration and meet the needs of the re-engagement has not been met yet. Understanding the needs of recruiters and applicants need a clear definition in order to ensure that the intents or conversation triggers of the chatbot can be set to not only communicate what is necessary and gain the correct information.

From talking to recruiters, four crucial information steps need to be defined in order to follow the sequence and end up at the final stage. The recruiter needs to know if they are willing to discuss current personal information, the applicants search status, if the applicant meets the needs of the placement in mind and if they would be willing to schedule a time to discuss further. In terms of chatbot intents, or 'the intention of the user, or the users, interacting with the chatbot', a breakdown of the needs are as follows:

- Activity level (seeking something new or not?)
- Willingness to be contacted
- Updating information from newest CV
- Willingness to be contacted further or by other means

Not only are the information steps needed for the recruiter to gain a better idea of where the applicant is in their professional needs, but the updated information of what they have been doing since their last application. Having the chatbot gather this information cannot only reduce the amount of time needing to update their information from the recruiter side, but also from the applicant side. This is relieving both frustrations and needs of the stakeholders with one action. Figure 4.5 demonstrates the information needed by the applicant via intents for the recruiter.

There is also another case where these intents need to be mapped out before the creation and full dive into chatbot production. This is in terms of GDPR and data transparency. Below in Figure 4.6, the request of whether to keep one's data is given with more information on how the company is not only following GDPR Regulations but also informing the user more about them, in general, is mapped out. By the user, there is also a need to remove their data quickly and without hassle is also met. The needs can be outlined as follows:

- Willingness to keep data
- Compliance of GDPR regulation
  - Data Management
  - Data Storage
- Removal of Data

Mapping out the intents with the needs of the stakeholders being the main focus, can help ensure that the script of the chatbot will have a main focus, while maintaining a polite and caring manner. This will also help for future developments of the chatbot, as the 'blueprint' of the needs are showcased for easy tweaking and editing.

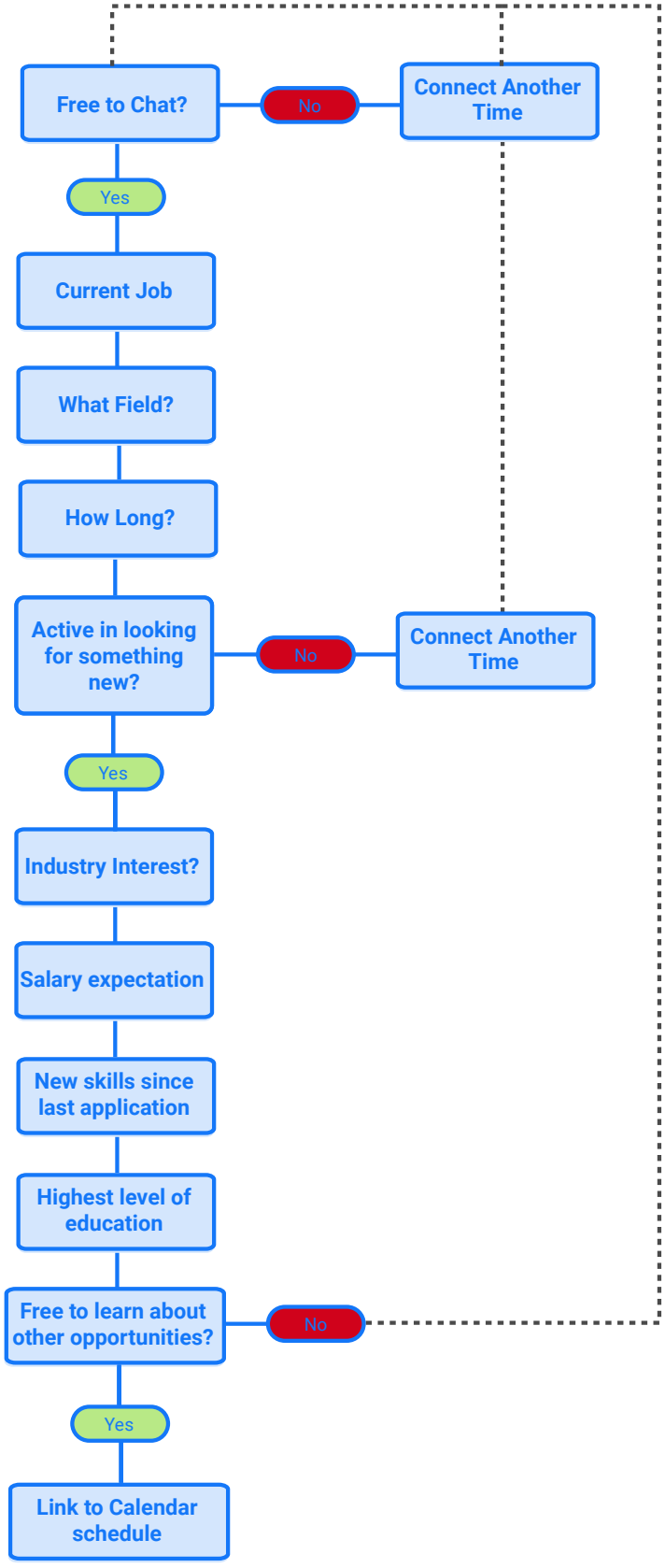

Figure 4.5: Scenario One Information Intents

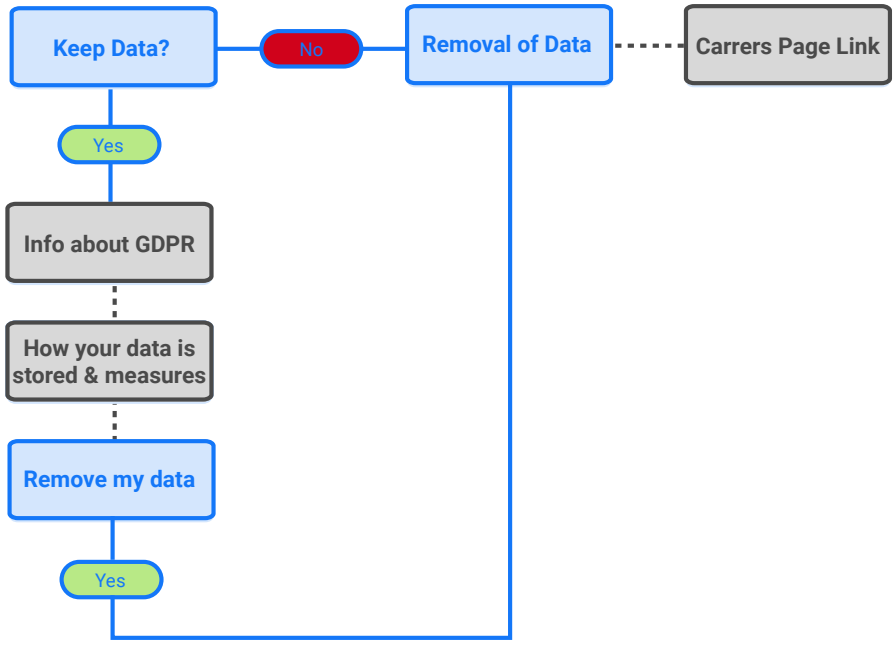

Figure 4.6: Scenario Two Information Intents

4.4.3 Chatbot Messaging Platform

Knowing a chatbot was needing to be created the next step was to research more about the development approach and what would be best for the aim of not only the thesis but would meet the needs of the users. This approach was based on how the development of the last Deploy chatbot was built.

Using a DIY chatbot platform are becoming some of the most popular ways to build a bot in comparison to using a bot development framework [46]. A bot platform is usually favoured by those who are new or beginners to help develop bots without coding but can also allow code integration for further specs or functionality [46]. Some examples of these platforms are *Botsociety* [1], *Motion.ai*[2], *Converse.ai*[3], *Chatfuel* [4]and *Flow.XO*[5]. Building a chatbot with such platform is as easy as simply dragging and dropping what is needed in the chat. Customisation is relatively easy and straightforward.

[1] https://botsociety.io/
[2] https://www.motion.ai/
[3] http://converse.ai/
[4] https://chatfuel.com/
[5] https://flowxo.com/

As this is one of the most popular ways to build a chatbot, there is much information out on forums and in community posts to help ensure that any idea gains help from other users [46]. There are also many tutorials on how to get started provided by the company. As many companies have multiple channels of communication with their users, the use of the DIY platforms allows for integration among multiple platforms. These were some of the main reasons for choosing to use this as the foundation for the chatbot creation.

Looking further into the companies providing such platforms, the preferred option to use Botsociety was chosen. This platform allows the focus to be about the chat experience not so much about the design [63]. It also claims to be one of the fastest ways to implement a prototype for a chatbot in comparison to any other DIY platform [76]. It also has a wide variety of channels from *Google Assistant*[6]to *Facebook Messenger*[7]. The platform allows for user testing right in the platform with the ability to make a recording or deploy the bot with Botsociety's API or integration [63]. The platform prides itself by allowing its bot creators to spend less time mimicking the experience and more time on what matters. That being the bot's tone of voice, possible issues in interactions and allowing more creativity to allow the bot to be more human-like, to have the best possible next generation of interfaces.

As past bot implementation was developed within *Facebook Messenger*, as well as it being one of the second most used messaging applications in the world, as seen in Figure 3.3, this chatbot will also be using such platform [7]. With such familiarity amongst the users, it was a challenge to choose another platform. The name chosen for this chatbot is Recruiti. This was brainstormed with a few recruiters from Helsinki. In the Finnish language, many words have an 'i' ending. Most English speakers see words ending with the 'i' sound such as cutie or shorty, as being something innocent and cute. Due to this and the welcoming nature of a chatbot with such a name, it was chosen.

4.4.4 Chatbot User Experience and Usability

The majority of best practices for user experience have been defined for web and mobile applications [13]. The usability factors of them have also been standardised. During my studies at KTH in Sweden, we were to follow the usability practices, also known as Nielson's heuristics as a baseline for any

[6]`https://assistant.google.com/`
[7]`https://www.messenger.com/`

design [62]. The design should also follow that of the Gestalt principles [36]. This is specifically for the organisation of visual components. Having such standards and guidelines in place is helpful when coming up with various designs to help lead the design in the right direction.

As chatbots or conversational interfaces are relatively new and do not cover the same design layout, many of the guidelines are only sparsely applicable. Researching more into standard practices and approaches, there seems to be a considerable debate among professionals in the field still. This is due to the multitude of platforms supporting the chatbots and also the topics and swift advancements within the field [10]. With such fast advancements and adoption rate of chatbots within various industries, more research and devotion of standard practices will be explored. With platforms already having such an extensive community presence, it is only time before designers and developers come together to discuss how to develop a fruitful conversation with both user and development in mind.

Although no set guidelines and practices aimed at being followed step by step, there are, however, some guidelines from minimal exploration and understanding and are just options and references found multiple times from the chatbot industry. Many of these were also the foundation of how Deploys first chatbot was created for the Swedish consulting firm. The following are such practices with multiple references based on documented chatbot development and implementations:

- *Use buttons for guidance for replies:* These are some of the best guidance for the users to be aware of what is an acceptable answer for this designed bot. This allows the user to know what is possible for the chatbot to answer. There is no place for error with buttons as their inputs are predefined and will allow the conversation to flow the way designed. Chatbots need quick and concise information, and buttons are perfect for training the user on what is expected. They are also a quick reply with one click vs having the user type out a reply, lowering the error rate. [19]

- *Use emojis, images and graphics to add more familiarity to the conversation:* Many individuals use images and emojis as it is easier to understand than via text. This is also a way to understand not only the tone of the bot but also the personality. [81]

- *Conversion and human-likeness is critical:* keeping the conversation much like that of a human can help the user to feel more comfortable

and come to terms with although a bot, it is here to help. This is especially the case for first-time users. It should be in a universal language with words that are typical and easy to understand. Much like how humans speak, there should be lag times and pauses in typing to mimic that of a real conversation - response latency. Staying gender neutral is also advised to avoid issues. Using this in conjunction with emojis can help if an issue is to arise in conversation, such as a question that is not supported. [81]

- *Language Focus:* This is more a focus for the language style as a whole of the chatbot. Although the user is talking to a bot, the conversation and style needs to be variating in knowledge and seem human-like. The personality and style of the chatbot are essential to how the user perceives the information. Maintaining a polite and friendly manner is key to keeping the engagement of the user while also seeming convincing. [31]

- *Hint at a conversation:* Just like in a real conversation, things are more comfortable to begin if someone else leads the way. Letting the user know how to interact with the chatbot is critical. Having the chatbot say 'hi' first or even by just using a hand waving emoji is enough to invite the user to converse and may lower potential hesitation of communication. [69]

- *Do not provide much information too quickly:* The conversation needs to be planned out with an intention in mind. Plan it out in a manner that allows the information needed, to be accessed in the short amount of time. Concentrated information is vital for users. The richer a text can be, the fewer words the user needs to read. [81]

- *Validation of Information:* When leading a user to a page with further information, be sure that one provide details to not only the link provided but where to find such information. As mentioned above, limit the reply to a concentrated manner. If the user is providing information, the chatbot should confirm how they retained the information. Much like reading back a phone number to ensure the ordering of the numbers is correct. If the information was misperceived, be sure to allow for edits and allow the chatbot to apologise when unable to meet a request. [81]

These standards will be kept in mind and used when developing the conversation flow for the chatbot. The use of this and the ISO 9241-210 (2009) standard definition for user experience *'a personas perceptions and responses that result from the use or anticipated use of a product or system'* will be used to ensure that this basic level of interaction experience is met [58].The development of the conversation will be explored in a later chapter.

4.4.5 Chatbot Language Style and Personality

As mentioned, there are so many platforms and communities out there to aid in the development of the chatbot. Much like websites and mobile applications, they are only as good as their content. If the content and writing style is no that can relay information in a meaningful and convincible manner, then it is of no use to its readers. Petter Bae Brandtzaeg and Asbjørn Følstad state that people come to chatbots that are giving them something in return - their time invested talking to the bot needs to be returned in terms [11]. Developing a chatbot with the use of a platform is only half the work in order to provide something in return to its users, making the chatbot successful. Users have high expectations of the quality of conversation whilst using the chatbot as they expect a similar level to that of a human.

With the interface just being the look of the conversational agent, the main context is that of the text. This includes the words, tone and personality of the bot. This is the genuine interaction of the chatbot and the user providing the experience. There are many enhancements that can be added to enhance the experience such as emojis. In terms of our chatbot Recruiti, personality, tone and principals will be elaborated on below.

Personality is a particular way of thinking, feeling, and behaving [33]. Personality embraces the moods, attitudes, and opinions and is most clearly expressed in interactions with other people [33]. This can also be held when defining how a chatbot is to interact with a human. If the personality of the chatbot is not one that is a user wants to continue a conversation with or return to, the AI implementation and work into the creation of the chatbot will thus be worthless [69]. Setting the expectations from the chat via behaviour from the start is an essential step in ensuring that the user is able to gain a level of trust quickly [69]. This, in combination with the stability of the conversation, can help not only increase the experience but allow errors to be accepted. Having a chatbot with such set personality can help the user adjust their way of communication with the chatbot, which will result in better expectations and outcomes from the interaction.

Recruiti shall follow the following styles of language in order to maintain a personality that will provide stability, gain trust and enhance the experience.

- Understanding and thoughtful but never demanding
- Confident and a specialist but never a 'know it all'
- Polite and cordial but not too formal
- Informative and easy to reach but never disorganised

When determining the reply and conversation flow, these styles will be used as a checklist to ensure that the experience remains the way intended. Personality framework is all about how the service may feel things and behave. Using English at the beginning will ensure that a personality can be well defined and copied later on with other various languages, as it is known as an international language [53]. This is also the working and communication style of Deploy and chatbots that have been created by them.

A recommendation by Kojoukarov suggests that using a style of language that remains simple, genuine and easy for the user to digest cognitively. This will allow the chatbot sentences to be concise without the use of technical or 'slang' language [44]. This will ensure that Recruiti stays informal, approachable but most importantly, proper and human-like.

As mentioned earlier, the 'use of emojis, images and graphics add more familiarity to the conversation' [81]. This will be one of the key points of conversation for Recruiti. Being able to interact with the use of emojis and stickers will allow the conversation flow to be more human-like and familiar [81]. A study actually shows that nearly 44 percent of chatbots on the Facebook platform receive stickers and emojis from users [54]. This is due to the user's conversation style and is also a way for them to ensure that the correct emotion and feeling is being passed on with the text written. The use of emojis will, however, be limited to ensure that Recruiti does not seem too unprofessional and keen.

Chapter 5

Prototyping User Flows and Scenarios

The following section will cover the flows of the user's interaction with the chatbot as well as the design goals of the conversation to ultimately meet the needs of the recruiters and applicants.

5.1 Conversation Design Goals

Conversational agents like chatbots only have a messaging interface and no graphics to enhance the experience or draw users in like other applications. With this, text is king. The way information is presented key in making an experience one to come back to. Ensuring that the conversation of the chatbot is natural but also provides the information that the user is wanting is one of the most challenging parts of the development. Majority of conversations between humans are much like the design thinking process, non-linear. This means that they do not follow a single flow, and much of the topics can be viewed as erratically changing. With having predefined goals of the chatbot conversation in the design, it can allow for the conversation to be more enjoyable [38]. This composition design will allow for the users to ensure that the information needed is found while limiting the buildup of stress from not asking a real human.

Looking back to the needs of the recruiters from Chapter 4, one can see that the following chatbot conversation development needs to be defined around the following information goals:

Scenario One: Seeking status and updating information

- Ensuring the user is willing to chat
- Further information on that they are doing now
- The status of their search: Active or not
- Updating information further from what they are doing now
- The interest level of more opportunities?
- Scheduling a call with a recruiter

Scenario Two: Complying with GDPR Regulations

- Allowing the data to be kept
- Removal of data
- Further clarification of data management and storage

5.2 Conversation Mapping

Once knowing the needs of the users and recruiters an intent flow needed to be created in order to map the conversation accurately. This is needing to be kept in mind as it is essential to design every interaction with the user by defining the chatbot's conversation and behaviour to each scenario.

Having the past two stages, Empathising and Defining stand as a solid foundation for the Ideation of the intents, is essential for the conversation flow and chatbot design. As Recruiti has two main conversation topics, two intend flows were created around the needs located in the previous stages. The conversation topics follow the two scenarios listed in section 5.1. Scenario ones conversation mapping can be followed in Figures 5.1, 5.2 and 5.3. Scenario twos conversation mapping can be followed in Figures 5.4 and 5.5.

These flows were viewed as 'blueprints' of topics needing to be created for the dialogues between users and Recruiti. This would ensure that we programmed the conversation to always have an answer, whether the user agreed or disagreed of the topic brought up during the conversation. This conversation text was solely created by the thesis author and was not influenced by any member of Deploy and was not approved or certified by the organisation

as it was solely a concept creation. Further development to make the conversation more client or company focus would be needed. Deploy was aware and will use such text as a foundation of a potential concept for future clients. For the creation of these intent flows, Sketch [1] was the software of choice. This was to not only keep the style in line with other flowcharts created for the recruitment definition but was easy to edit in the event that during testing, sometimes needed to be altered based on user testing and feedback.

[1] https://www.sketch.com/

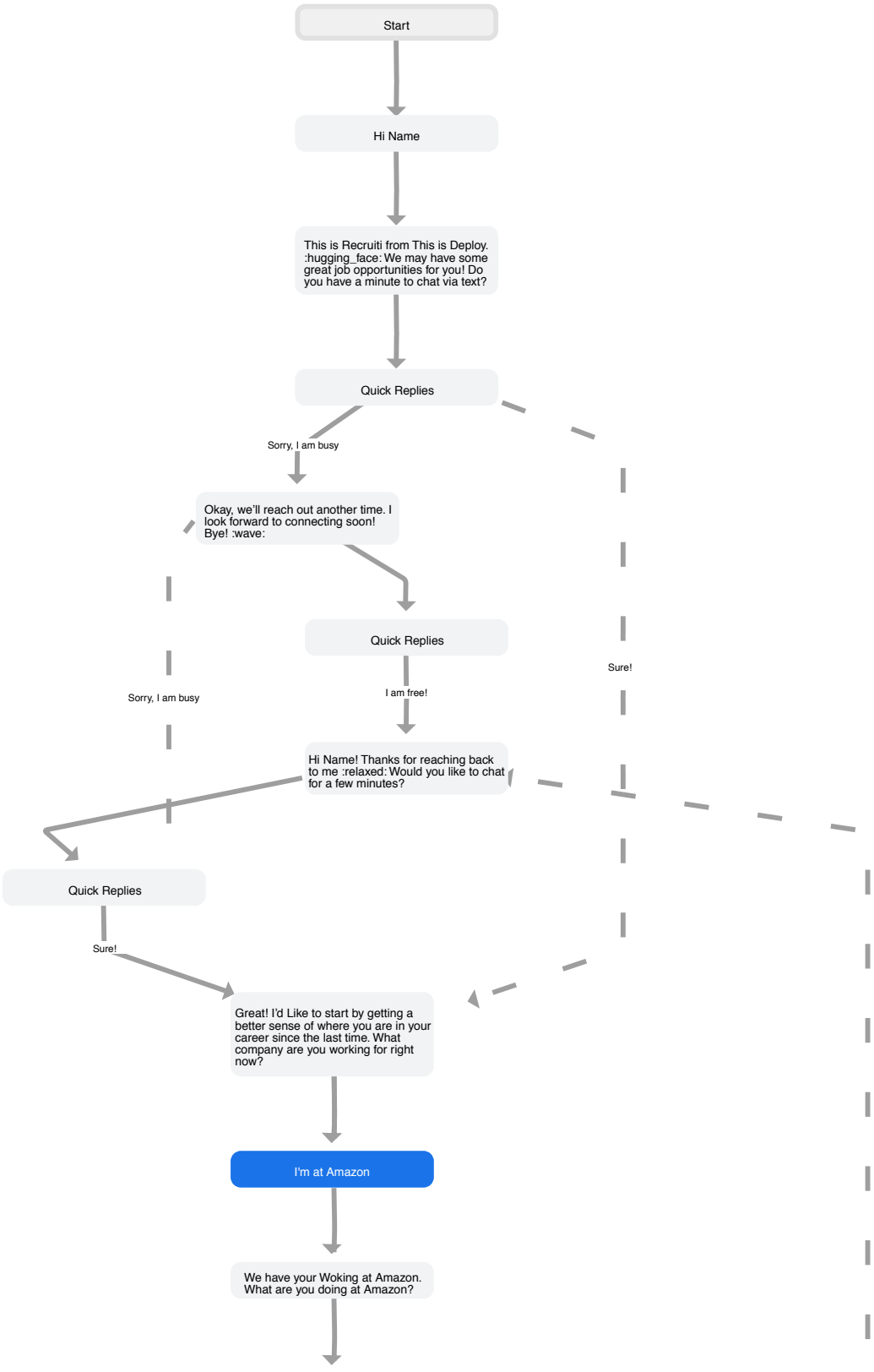

Figure 5.1: Scenario One Conversation Mapping 1

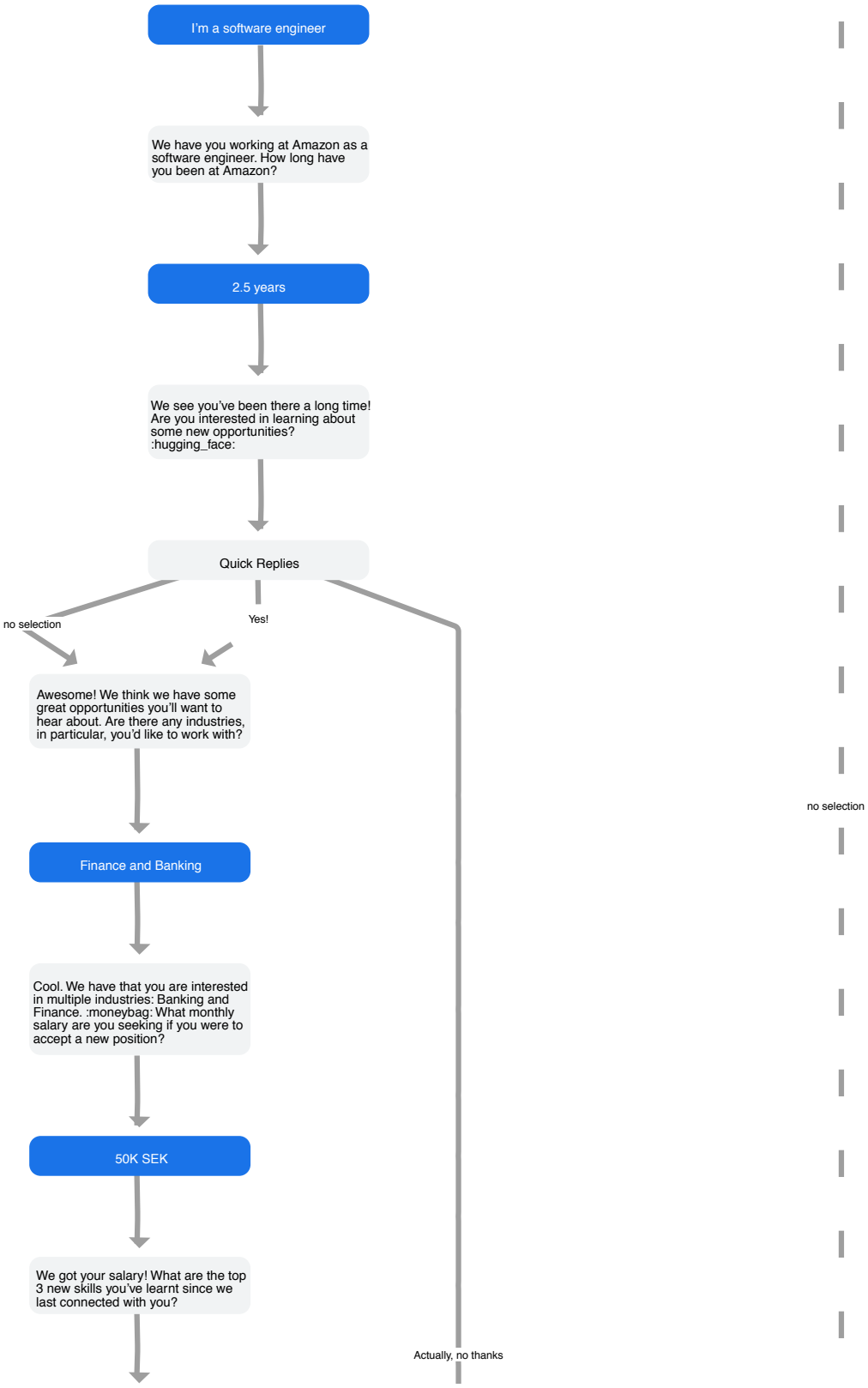

Figure 5.2: Scenario One Conversation Mapping 1.1

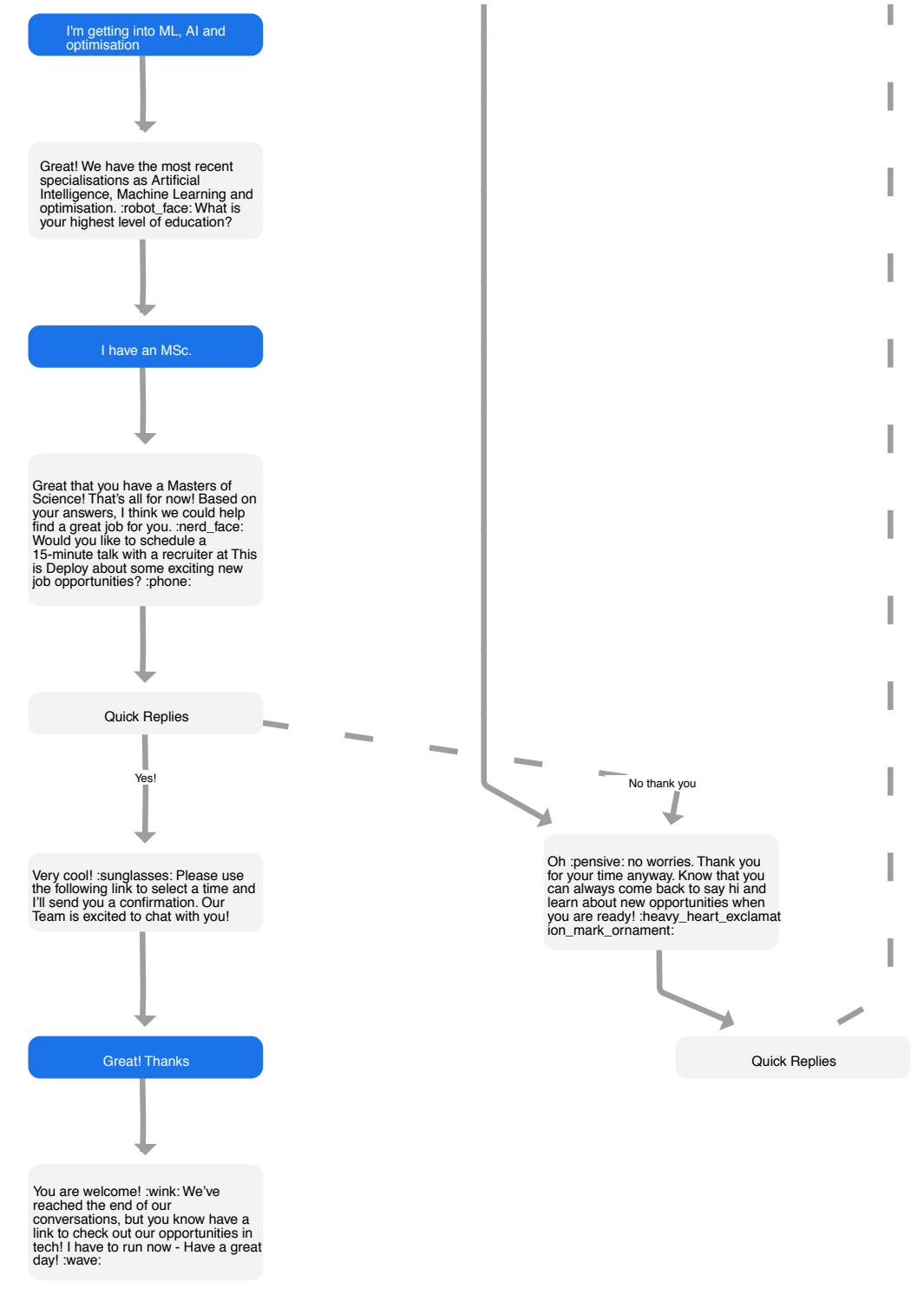

Figure 5.3: Scenario One Conversation Mapping 1.2

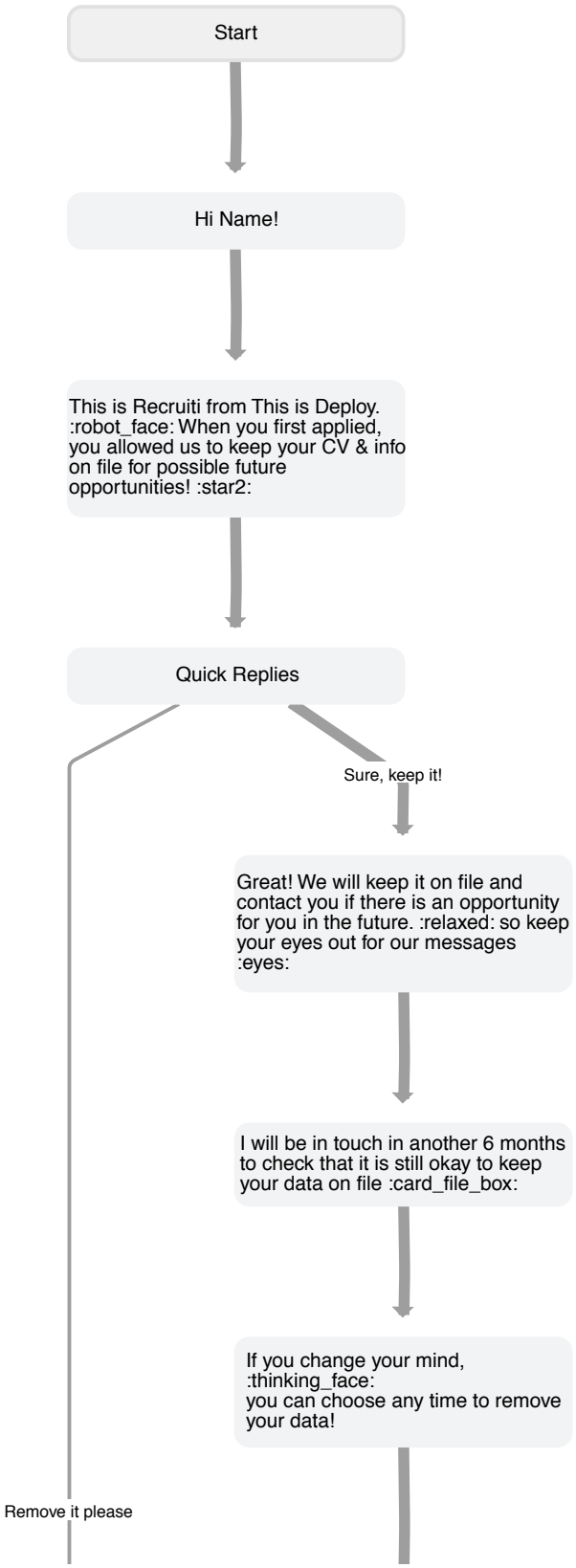

Figure 5.4: Scenario Two Conversation Mapping 1

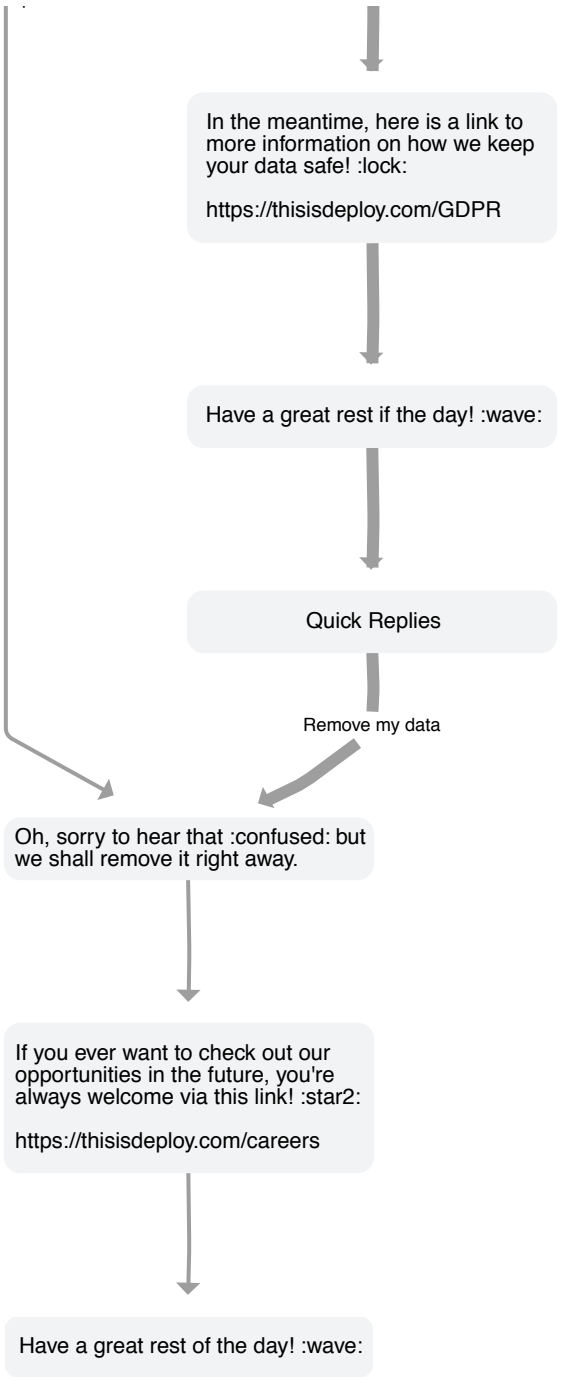

Figure 5.5: Scenario Two Conversation Mapping 1.1

5.3 Conversation Engagement

As mentioned earlier in Chapter 4 'Hint at a conversation', there need to be steps taken from the chatbot to initiate the conversation. This can be something as simple as saying 'hi' or having a waving hand emoji popping up. This can lead the user to feel more comfortable with how to interact with the chatbot but also show them the way to what they are looking for.

In order for a user to begin a conversation with the chatbot, the user would have to connect their account to the company's Facebook Messenger application. Once connected and open, Recruiti will pop up with a welcoming message. This helps the user understand that Recruiti is trying to communicate with him or her. It is a perfect introduction to the tone and personality of the chatbot as an introduction statement will be the next message to follow. This follows the trend of most applications where full explanations of the functions are given, alongside the purpose and aid it can provide to the user. This is usually seen as a 'starting guide' rather than a conversation. Something that many users see as being cold and willing to skip versus a conversation that is more personal and shows effort. This can help the user feel more at ease with the chatbot while seeming to be more human-like, something also mentioned in Chapter 4.

As many of these users are frequently using messaging applications, the need to ensure that a user-friendly manner is thought of when creating a dialogue for the chatbot. One that sets the user up for success rather than failure. Although this conversation may seem human-like, there are only so many requests the chatbot can handle at once. The chatbot is much like a Google Search, with a smaller amount of text that is rich and keyword orientated required for optimal results. Many chatbots communicate with their users via button-based navigation rather than text alone as it is not only easier to build but builds a better experience for the user [38]. Facebook has made this easier for Messenger developers by including this capability. They even made it possible for button only based conversation, allowing more defined and faster ways for the user to understand what the chatbot can help with while gaining the information they need [23]. This also allows for the user to say in a linear conversation style, one that chatbots performs best at. This also allows the user to learn from the foundation of how to communicate with a chatbot in the event that they have never interacted with one before. This allows the user to gain confidence and view of how to communicate with chatbots.

Recruiti will have a combination of conversation styles. This will allow the learning curve of communication for the user to be set early on to gain trust and relieve any past frustration of past experiences. Conversation breakdowns can be seen in the figures to follow:

5.4 Persona Development

Delving deeper into the needs and how to develop the various scenarios, the need for a persona to reflect the needs of the users during the testing was needed. Personas condense qualitative information taken from the applicants' section of the empathise and define phases in Chapter 4and allow the usability testers to act as such user, ultimately allowing the needs of the applicants to be directly tested on the chatbot. "A persona is an archetype of a user that is given a name and a face, and it is carefully described in terms of needs, goals and tasks. It is one of the most commonly used and underrated user-centric design methods". [42]

Referring back to the needs of the applicant in Chapter 4 (Empathising with the Current Recruitment Process), a persona was created around those identified and are further outlined in Figure 5.6.

Axel was created based on a fictional character that represented many characteristics of those who would be potential users routed in past research. The persona demonstrates the following needs:

- Reflecting the want to remain connected
- Wanting to see how companies differ in the way they interact during the recruitment process.
- Younger generations, like millennials, are early adopters of technology, messaging platforms and are primary target market age for chatbots.
- Tech-savvy individuals tend to like to use technology (the majority have prior use of chatbots) but are more conservative with providing data without knowledge of handling
- Used to staying connected and up-to-date on the many activities in life, applications and recruitment always seems to be a grey zone.

Figure 5.6: Persona - Axel

This persona will act as the foundation of the individual interacting with Recruiti for the scenarios to follow. During testing, it will also serve as the role the testers will be testing as. This will allow the participant to be put into a mindset where they are able to interact with the chatbot fully. This is due to the chatbot not having full AI capabilities and limiting the error rate of the test. Not all testers may be in an 'active' search status and would thus not interact with the chatbot but on two occasions.

5.5 Scenario Flows

The scenario flows were developed over multiple conversations reiterations and edits to ensure that the conversation seemed natural and human-like. The conversation was designed with the guidelines mentioned in Chapter 4. These guidelines helped polish the conversation into what is being presented in Figures 5.1, 5.2, 5.3, 5.4,and 5.5.

It helped keep the tone neutral while maintaining the personality designed and defined in Chapter 4.

Although all researched practices, in theory, should be used, not all of them in practice was possible for these scenarios. The following practices were followed when writing the conversations:

- The text was broken up into multiple messages to ensure that the user was not bombarded with too much information at once. This will allow the user to have shorter flows allowing for the information to be of more valuable content in an appropriate amount of time. *(Do not provide much information too quickly)*

- As Recruiti was designed for simple communication, leading the user to the correct reply was a simple way to go about leading the user to the correct response that the user would set them up for success. They clearly know how to use the buttons in order to handle the situation and how to carry on the conversation. *(Use buttons for guidance for replies)*

- When the user opens the chat, Recruiti will greet the user. This is done to set the tone and personality of the chatbot to the user. It also informs them, who the chatbot is, how to use it, and how it is there to help. This ultimately helps limit any potential hesitation some users may have towards speaking with the chatbot. *(Hint at a conversation)*

- Each time the users provides information, Recruiti will relay the information to ensure that what is registered to be updated on the user's profile is correct. This provides validation to not only the information is being recorded but also provides a clear image to the user that the chatbot does have smart capabilities. This will help gain trust and show value to the user if any hesitation is valid. *(Validation of Information)*

Scenario One: The following scenario is designed to inquire about the status of the search for the applicant. It allows for the chatbot to gain the proper information needed to not only update the profile but the status of the application to the recruiter. If all requirements are met by the applicant, they will then be invited to connect with a human recruiter for further information about current job openings. The scenario flow can be found in Figures Figures 5.1, 5.2 and 5.3.

Scenario Two: The following scenario is designed to inquire whether the user would like to continue having their application stored with the company. Moreover, it allows the user to gain more information about how the company views GDPR and how they are managing/protecting the data. The scenario flow can be found in Figures 5.4 and 5.5.

Having the mapping of the flows laid out with fundamental interactions planned, the blueprint of the chatbot was created. This is an essential and vital stage for the following prototype to be built using Botsociety. Ensuring that the foundation is set, will allow for more straightforward tweaks and improved it of the text in the future. Although the text and scenario flows were tweaked and enhanced at every stage, user testing was required to validate our conversation expectations.

Chapter 6

Chatbot Development and Testing

This chapter describes what steps were taken to implement the chatbot using Botsociety based on the scenario flow blueprints created in the last chapter. It also elaborates on how the usability tests were carried through with the aid of a persona, concluding with a survey based on the experience of using Recruiti. Both conversation scenarios with Recruiti are public and can be viewed through the following links:

Scenario One: `https://app.botsociety.io/s/5ccbed79e278e9063226db56?p=c2242dce2125099b5358c19c0c970ccff30da891`

Scenario Two: `https://app.botsociety.io/s/5cdcfb7c433fd1f19e90b52a?p=7659063b2f1b5488fe489b8e804e57f43cdedce4`

6.1 Implementation with Botsociety

As mentioned in Chapter 5, the Botsociety platform allows the focus to be about the chat experience not so much about the design. The software allows one to create an interface in multiple conversation interfaces on mobile focusing on the interaction of text and creating an experience, rather than on the commands of the AI model. With the flows already created, two projects were set up in Botsociety's space seen in Figure 6.1, for Facebook Messenger.

From this point, the foundation of the scenario flows was developed using the various means of conversation interaction designed. In some cases, this was in terms of buttons and other free text. As seen in Figure 6.2, the cre-

ation of buttons was quick and simple with the 'quick reply' feature ready for customisation. This is in addition to tradition text boxes also seen Figure 6.3.

The interface of Botsociety is quite easy to add not only one's text but also to implement the emojis needed, as followed by the guidelines introduced in 4.4.4. One of the most challenging parts while creating the conversation was ensuring the intended buttons linked the proper path of the conversation. The organisation outline found in the scenarios flows found in the previous chapter allow for easy understand and an efficient chatbot development for various paths. An example of the various paths designed for buttons from scenario two in Figure 6.1.

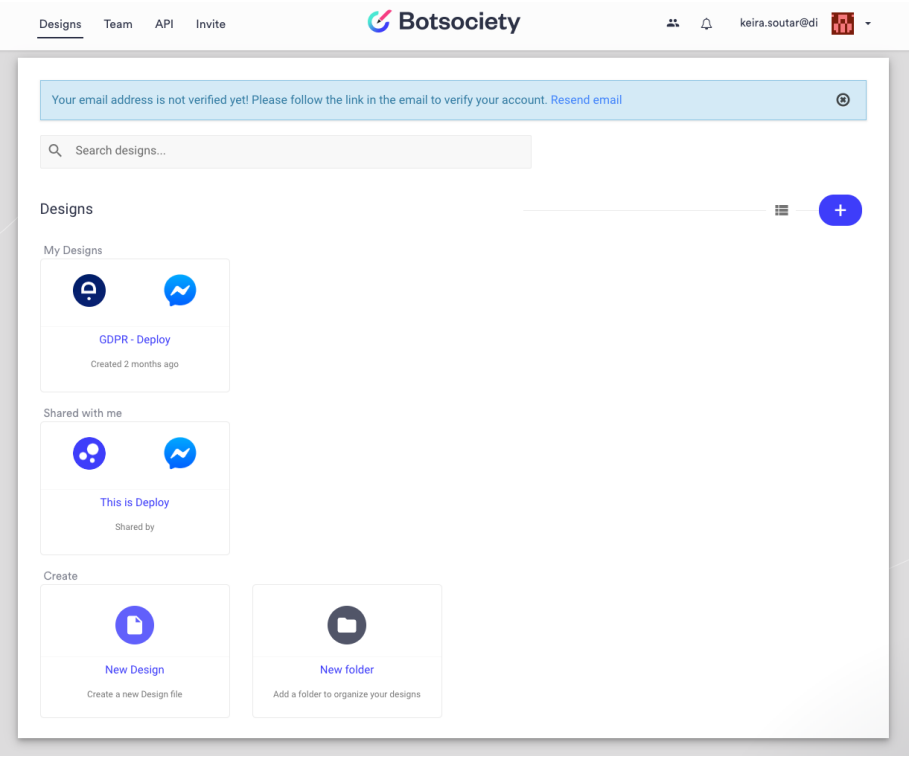

Figure 6.1: Botsociety Project Dashboard

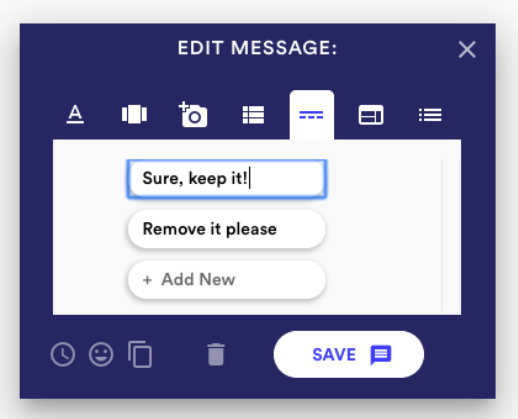

Figure 6.2: Quick Replies

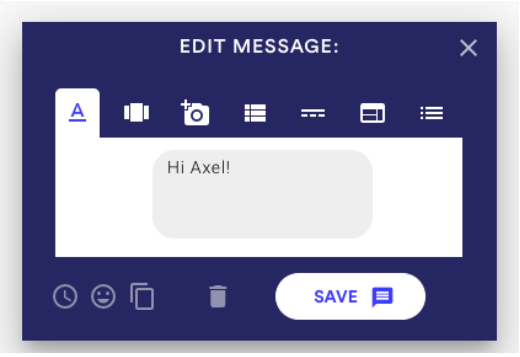

Figure 6.3: Text Box

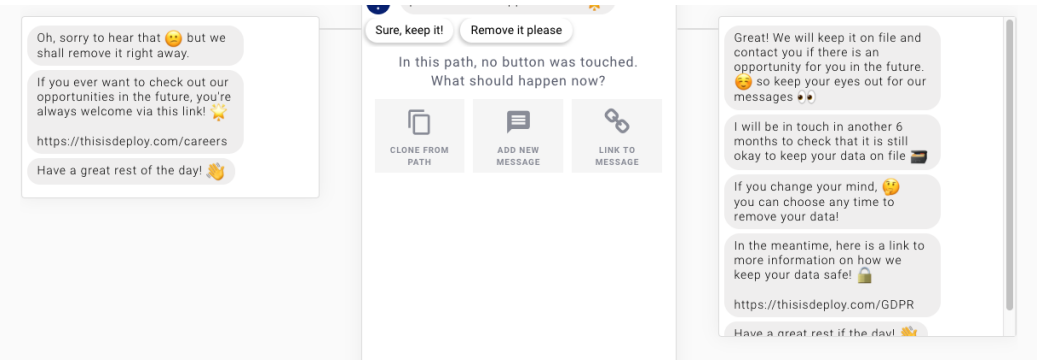

Figure 6.4: The Recruitment Process

6.2 Usability Testing

6.2.1 Target Users and Testing Environment

For this usability test, all individuals interviewed from the Empathy stage were invited to participate in the chatbots usability test. Fifteen of them agreed to partake in such a study. These individuals all had some experience with the recruitment process, some more than others. Some individuals were currently even in the recruitment stage with companies, giving a more fresh and direct experience. Eleven of the sample size were female, and the remaining four were male. They were all within the age range of 18 - 55 years old. They all lived within either Stockholm or Helsinki and worked in various business sectors.

The experience level of the participants ranged with experience of the Recruitment process. Six of the individuals were currently looking for a position and were directly in the recruitment process. Three of the individuals had one to three years within their current company and have not been active within the recruitment process during this time. Two of the individuals have five to six years within their current companies and have also not been active within the recruitment process during this time. Four of the individuals are currently thesis workers. Although they have experience with applications and recruitments for thesis positions, they do not have any experience in applying for full-time positions.

The participants were sent an email scheduling a time that was best for them during a two week period. From this, the participants would come into an office and be introduced to who Recruiti was and to what they would be doing. An introduction to Axel was given, and the printed version of the persona was given to each individual in case they needed to reference it throughout the testing. It was also mentioned to them that at any point if they did not want to participate in the testing at any point in time, they could exit the session. This was due to the participation being voluntary. At no point did we want them to feel forced or pressured to participate. During testing, all participants completed two chat interactions of the chatbots, one for each scenario on Google Chrome via a laptop. Therefore, all data was valid and analysed. Participants were asked to voice anything they felt during the testing to ensure assumptions from the observing side were not made.

Once the interactions were complete, the participants were asked to complete a survey about the experience of interactions. The survey was designed

using Google Forms[1], as it was something that most individuals had most likely interacted in the past. Also having a brand name that was known to everyone signified that this means of data collection would be for the sole purpose of this study and nothing else. The survey was accessible via mobile or laptop in the event of an issue with the testing laptop or mobile could be used. Users were asked to voice any reason to why they chose various questions during the survey if they so wished.

The link to the Google Forms created for this usability test can be found here: `https://forms.gle/59vUXgrf85x4RUnWA`

The information gathered from how the users felt during the usability test is qualitative information gathered from various quotes written down during testing. The survey results qualify as both qualitative and quantitative from numbers gathered during the survey but also with quotes taken from some individuals to why they responded the way they did to various questions. These results from the survey can be found in Appendix A.

6.2.2 Results from Survey

Looking into the data of the post chatbot survey, the following insights were discovered :

- **The chatbot experience was enjoyable:** From the measurements gathered, the average or mean of the participants experience on a 1-10 scale was 8.46. This number results in the fact that the participants did find the experience reasonably enjoyable. Having this validation helps ensure that having a chatbot with higher user experience will help show the value not only to the company but also to the users. This will encourage the growth of the technology within the industry, ultimately growing the validation of the technology as a whole.
- **Using an unfamiliar platform and potential lack of validation of communication:** From the survey numbers a little less than three quarters have interacted with a chatbot before. This former interaction gives a great baseline to what the users may expect. With the Nordic regions usually being at the forefront of technology adoption, it is no surprise that there was such a high number already in place of those who had prior experience. As the participants were within a broad age

[1] `https://www.google.com/forms/about/`

range, it is understandable that those older than 40 may have a potential difficulty using the chatbot as an actual means of communication. This could also be in the respect that the chatbot was on the Facebook Messenger platform, and 67 percent of the participants declared either Telegram or Whatsapp to be their favourite. Although with the adoption of new technology in favour and prior use of chatbots, it was built in an environment not as familiar to the majority.

- **There is some hesitation in trusting the chatbot with personal information:** Although the users did have a high number in their overall experience, there were a few individuals who were, in fact, hesitant of providing personal information. The average or mean comfort level of the individuals was that of a seven. Although tech-savvy individuals are more accepting of the technology, there is always hesitation towards providing data in the world today. One user did note that taking the time to look more into how the company perceives GDPR and how data management is done, this number could increase.

- **The chatbot helped the company seem to want to connect more than others:** The participants and any applicants want to feel wanted. Sixty per cent of the users stated that having the chatbot reach out to them and keep connected, made the company seem to care more about them than others. The other forty per cent stated that it made it seem like the company cared a little more than others. This positive finding demonstrates and validates that this is a means of communication for the company and applicant, and the information given by the chatbot was not only intelligent but reliable.

- **Most would use the chatbot again to update information:** As mentioned in the previous point, there was a positive finding in how a chatbot is a valid means of communication for this sector of recruitment. This is also, however, the same with the numbers of asking if the participants would use this style of communication to update information in the past. Ten of the participants said that they would definitely update their information if reached out again and only five participants said that they maybe would update their information. This positive finding shows that more than half of the individuals do accept this means of communication for not only the present but also the future. Nine of the ten willing to update their information in the future also be willing to tell others of not only the means of communication but also about the company.

Following the survey, users were asked to pinpoint and elaborate on what they liked about their interactive experience and what they did not like. Many of the users stated that they liked that it was simple and straight-forward to what they could do. 'With the use of the button replies, I knew what was supposed to be said and how to carry the conversation.' 'Easy to use UI.' 'Much like a general chat, I would have with anyone via Messenger.' They also mentioned that they like this as a way to update information. 'Many times, I have to reapply. The worst is that even when you need to fill out what you have already in your CV. What is the point of a CV then? Here it is an informal interview with something already familiar.' Many of them also liked the way the chatbot interacted. 'The use of emojis was playful and made it seem like much thought was put into the conversation.'

When asked about the factors that they didn't approve of or disliked, two of the older participants said the use of emojis was too much and took away from the seriousness of the situation. 'At the beginning, they were nice to see, but carrying on the conversation, there are too many.' 'My daughter would like the style of communication, but for me, it is too informal.' Although the participants knew this was just a prototype, there was a wish for more interactivity and personalisation. This would be in terms of creating the chatbot to be smarter and have functioning AI capabilities. 'Being Axel was easy and fun, but trying it out as me would be interesting.' 'I would like to see what else Recruiti could do. Could it schedule times for calls and send calendar updates? Having more features would make me more keen to use it.' Creating the chatbot to be more intelligent with more interactive features is something that was not requested by all participants, but many did ask about the next stages of advancements to Recruiti.

Chapter 7

Analysis of Results

Earlier in Chapter 2, research questions were presented in order to help validate and evaluate the study conducted on where in the recruitment process, the use of a chatbot could aid. *Research question one, what are the current pain-points within recruitment?* Was primarily researched and validated using the user-centric method of design thinking. Interviews were carried out from both recruiter and applicant side to empathise with and define the needs of the users, stages of the design thinking process. Although there were many pain-points discovered, re-engagement of past applicants and the management of their data with new GDPR regulations was the case with the most identified actions needing to be taken.

The second research question was divided into two subsections to help determine *How can a chatbot be incorporated to aid with the pain-points located within recruitment?* Focuses on the *overall experience of the interaction* with the chatbot.*Moreover, what was the comfort level of giving information about yourself to the chatbot?* This portion of the study required the use of both qualitative and quantitative information from the users through a usability test and post-testing survey. These we carried out after an ideation and prototyping phase where the needs of the users, defined from research question one, we're focused on with UX and industrial suggestions as a foundation, as well as through a persona designed. Looking from the results of the usability testing and post-survey, the users expressed that the overall experience of the interaction with Recruiti the chatbot was enjoyable and useful. There was, however, some hesitation on providing personal information to the chatbot. This was not based on the chatbot seeming dumb or unable to comprehend the data but more towards the users' unawareness to where the data would be managed and stored. Overall, the majority of the users stated that they would use the chatbot for means of updating their information in the past

and helped maintain a positive image of the company, as the connection was kept alive.

The methods used for this study helped create a solid foundation in locating the needs of the users and help create an idea to help meet the needs. When developing the chatbot or conversational interface; however, no such guidelines or industry standards for methods have been defined. Having such rules and guidelines defined for other technologies in this day and age set out to ensure a successful application or website, the technology sector of conversational interfaces rules and guidelines are missing. Based on material found during the literature review and prior knowledge from other rules and guidelines in the application industry, the process for Recruiti's development was flex based and not strict by any means. Due to this lack in the industry, there could have been other ways of approaching the implementation. Recruiti was designed developed to showcase a potential solution, much like the design thinking process, there is always an option to re-evaluate and improve based on further implementation and testing. Through this, and the UX principles designed defined in this study, the step to creating an industry-standard will hopefully be met.

Although the conversational interface was created using Botsociety with no AI capabilities, the interaction design of the chatbot was developed enough for the user to follow the conversation and update the data needed. Using Botsociety was simple and allowed tweaks to be made quickly with no coding necessary. The initial development had a fast learning curve with elements like buttons already incorporated and individuals within the company always willing to help or troubleshoot. It allowed for an interactive interface to be built, tested and understood. Although it lacked some of the AI elements needed to make the conversational interface truly intelligent, for the means of this thesis and evaluating the experience of the interface, it was idyllic. Too many teams focus too much on the AI and NLP behind the chatbot when, in reality, they need to focus primarily on ensuring that the experience of the conversation is at the foremost importance. Without a good conversation, user experience and understanding from the user, the work and effort placed in the AI and NLP elements will be wasted. Gaining the industry that creates chatbots with better experiences for effective chatbots that may only give solutions for particular more defined scenarios can help increase not only the trust and understanding of chatbots but help create smarter solutions for many needs within the industry.

Chapter 8

Limitations

Although the study was conducted with results in favour of the chatbot being a valid solution for re-engagement of applicants during recruitment, there were some limitations in the following sections:

8.1 Chatbot Development Limitation

As this thesis was a time-sensitive study, the choice of platform and framework was based on a fast learning curve, user percentage and output. Many of the limitations were either within the restrictions of the platform of Facebook Messenger with the implementation and limits of the Botsociety framework. Using these two tools together for the first time for chatbot development, I ran into a few limitations on how to work around it. With the questions faced, not being asked in a forum, aid was needed via Botsociety employees. This caused a few minor delays in implementation, but ultimately, a solution was found by changing the design in the scenario flow and approach for future cases. With more experience of the technologies, the turn over time with the issues could have been more efficient. The lack of guidelines and industry set practices in creating the conversation flows also required more research in how others implemented practices, as well as research into other working practices of interaction. The chatbot also as a lack of AI and NLP qualities, it was designed with a pre-trained conversation. This hindered the true interaction of the chatbot and set it in the shoes of the persona created. Allowing the participant to interact as themselves could have allowed a more personal and deeper connection to how Recruiti was created and provide deeper, richer feedback.

8.2 Participant and Measure Limitations

Having a use case of this Chatbot set in the Nordics limited participants to be those within a technology-driven and early adoption society. Such a study within another region of the world with the hesitation of technology implementation could have opposite results from what presented. There was also a higher number of females participating in the study versus males. Although fifteen participants were used for the usability test, this sample size is quite small, and further testing could increase the validation of the study. The participants were also from a wide range of industries. Having an actual list of individuals from a past job posting could have given better insights to not only the participants' experience but willingness to provide information. Various industries are also more concerned about providing information than others. Having a study to define an industry would probably give a more transparent and more defined answer on which industry to apply the use case first. This could also help increase the level of interest to the participants as it is something apart of their real-life versus a scenario the participants of this study were placed in.

As the usability testing was conducted in an office, not the participants' usual place of interaction with a company, they may not have felt as comfortable. This is also the case, as my presence was also there during the testing. The individuals could have also felt more pressured to reply in a more positive manner than what truly experiences in hopes to not make the situation awkward or the thesis author feel bad. None of the users quit during the testing either, although they were told many times that if they wished to not continue for any reason, it would be totally acceptable. This, again, could have been influenced by my presence and the psychological need of not wanting to let someone down. The use of both qualitative and quantitative data allowed further insights to be gathered to help validate the study. Although, the environment could have been more natural to the participant to place the focus on the situation and experience rather than providing data wanted by the researcher.

Chapter 9

Conclusions and Discussion

This thesis aimed at discovering various pain points within the recruitment sector of Human Resources. Using the methodology of design thinking, empathise and define stages were conducted via interviews in order to gain a better insight into the recruiting world. After discovering that the area of re-engagement was not only frustrating for recruiters but also for applicants, the ideation stage was conducted to help create solutions for the frustrations with the use of conversational interface technology. Ideation began with a comprehensive literature review of not only the method being used but to gain more background information of conversational interfaces and the experiences from industry and users thus far. Developing a prototype was the final stage before testing with potential users. The chatbot or conversational interface prototype was implemented with two scenarios in mind. The development was then carried out with UX and industrial suggestions being the foundation of various choices taken. This implementation was then evaluated with the use of another user-centric design method, personas and a usability test was conducted.

It has been proven in many other industries that chatbots are used and valued means of communication[10], also discussed in other research in Chapter 3. The extent of this thesis demonstrates that the areas of recruitment are also a logical and effective way to provide more insight into the applicants of how companies are trying to keep in communication. Whether this is in the scope of re-engagement or for more information on compliance with GDPR, Chatbots can help bridge the gap that many companies are facing in this time of digital transformation. With the ability to communicate and reach out to so many more people, chatbots can be that bridge needed in keeping communication up during the recruitment process. A chatbot to help keep the applicant aware of changing terms and conditions or even how their ap-

plication is doing is key to improving the satisfaction of the applicants. It can also help with brand management, showing directly to applicants before they even learn more about the company, how it is setting itself apart from the competition [30]. By allowing the applicant to update information effortlessly in means of a normal chat conversation, the recruiter is able to pinpoint which applicant is still actively looking and eliminates menial tasks completed by the chatbot. This allows for the investment of the applicants in the past to be reinvested, allowing for a higher rate of investment of the time spent by the recruiter for the applicant.

As Recruiti was developed as a use case for Deploy to gain a better understanding of where a chatbot could be implemented within the recruitment lifecycle and to validate if this is, in fact, a solution that meets the needs of the users. As a foundation, this study should be improved in the following areas in the future before proper implementation into any company:

- **AI and Chatbot Training:** Developing a substantial conversational interface interaction experience that meets the needs of the user is only the beginning. Ensuring that the interaction is also intelligent to increase the understanding of the user on all levels is necessary to complete the experience. Adding and implementing 'smart' indicators to the foundation of this concept will only enhance the conversation and allow the chatbot to be at its full potential. This, alongside multiple pieces of training to ensure that the robot is able to handle multiple writing styles, is key to ensure that it develops to know how to answer questions, no matter the person asking. Alongside NLP and AI solutions, adding a dashboard to view more in-depth into the analytics behind the bot can also ensure that if issues are rising multiple times, the chatbot knows how to answer and if not, then leads the user to a real individual who can help. The chatbot is created on the foundation of the needs of the users. Knowing where the chatbot is missing answers can only help the development on how the information is delivered. Like anything with the design, re-evaluation, development and implementation are required to make any product or service last. Lastly, when dealing with personal information, the proper security measures need to be taken in order to ensure that all aspects of the chatbot are defined and implemented with security in mind
- **Platform and Industry Research:** Due to the time constraints, there was a lack of industry-specific focus for this project. More research and understanding of those industries that would be the best adopters, ambassadors and have the most desire of help is needed.

Having this as a new foundation on top of making Recruiti more intelligent can help set the standard of recruitment in one sector with others wanting to follow the trend. This is also true for the platform of use. Facebook Messenger works within the Nordics, but more research is needed to ensure that if wanting to expand and test within a new region of the world, validation of the platform of use needs to be researched. For example, if Recruiti would be implemented in China, WeeChat would be the wiser platform, as Messenger is forbidden in China.

Looking back to Chapter 4, there were two primary pain-points discovered within the define stage. The other pain-point discovered was that of internal hiring. This could be another area of implementing the design thinking methodology in order to validate if the concept of internal hiring and Recruiti could be a solution. Employees could also use Recruiti within the workplace to communicate and learn about positions within the company. This not only advances the area of help for Recruiti but also helps grows with the recruitment lifecycle, willing to help at any phase.

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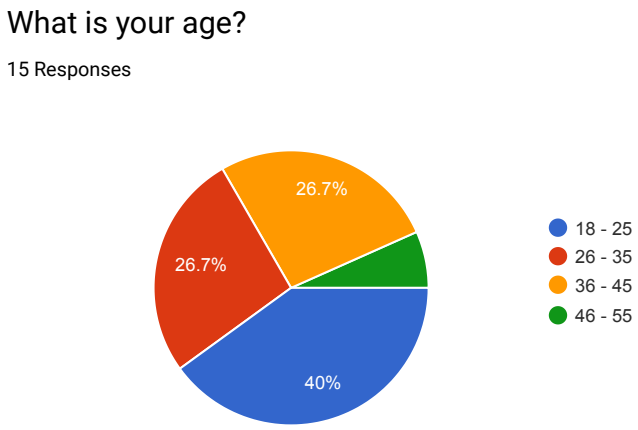
Appendix A

Results to Survey



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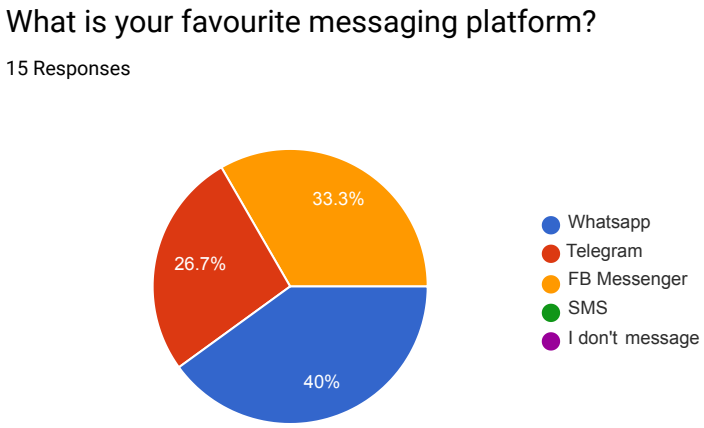

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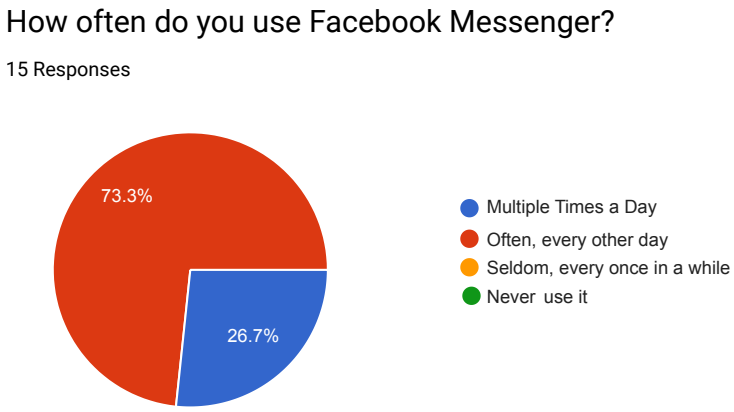

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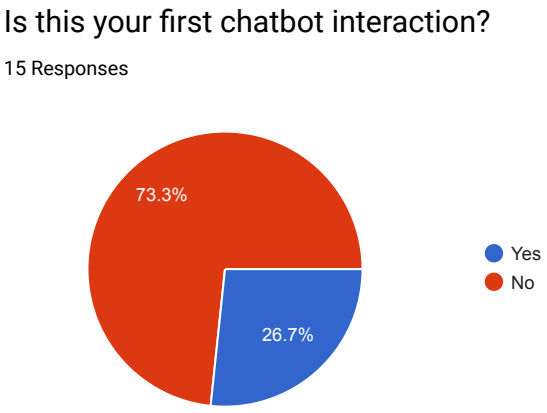

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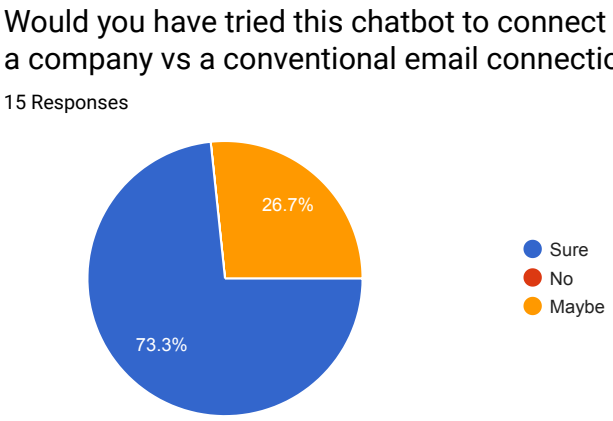

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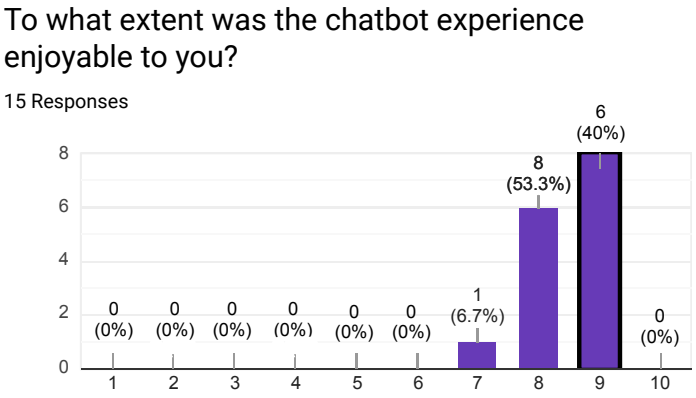

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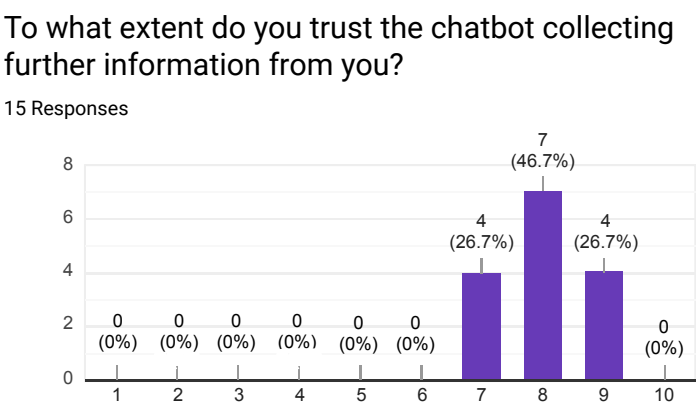

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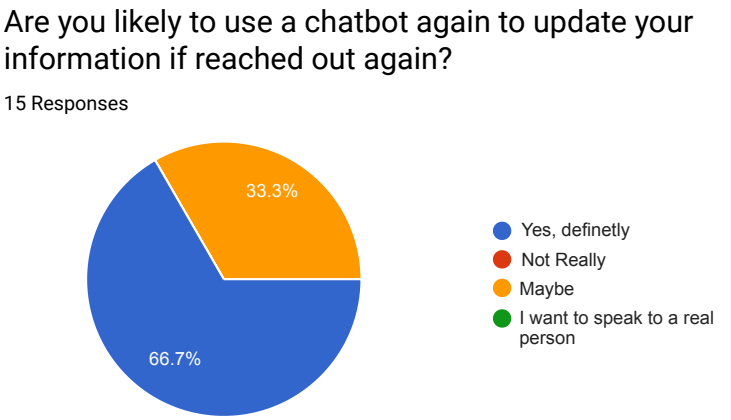

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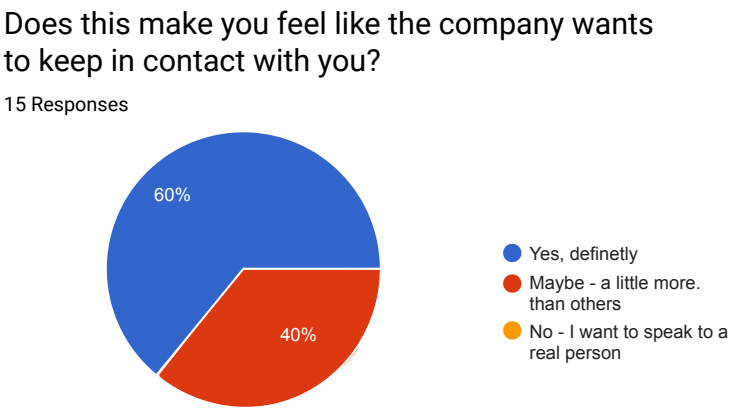
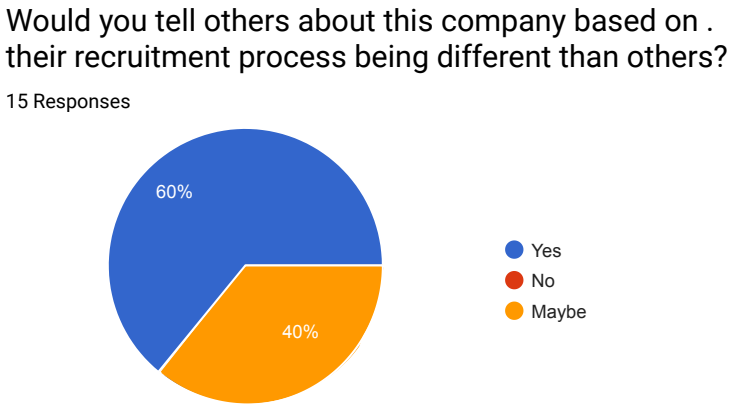


(i) Question 9



(j) Question 10